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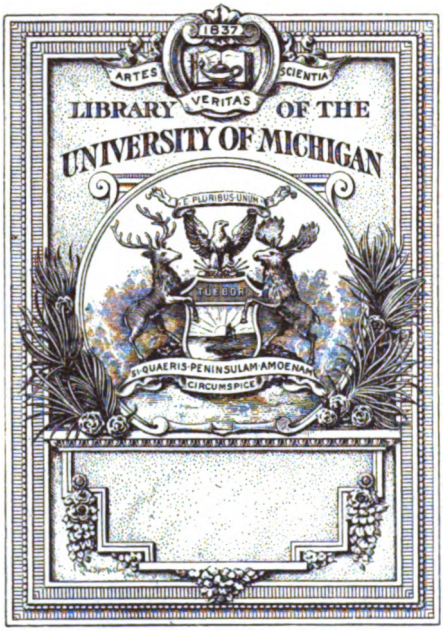

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60TH CONGRESS : : 1ST SESSION

DECEMBER 2, 1907-MAY 30, 1908

HOUSE DOCUMENTS

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CONTENTS

No.
57. Examination of Deckers Creek, W. Va.
58. Examination of Beech River, Tenn.
69. Examination of Blaine Harbor, Wash.
70. Examination for ship canal connecting Puget Sound with Grays Harbor.
71. Examination of Au Sable River, Mich.
72. Examination of Grand River, Mich.
73. Examination of Menominee Harbor, Mich.
74. Examination of Coscob Harbor, Conn.
75. Examination of Niagara River from Tonawanda to Gill Creek, N. Y.
76. Examination of Lower Thoroughfare, at Wenona, Deal Island, Md.
77. Examination of Islais Creek, Cal.
78. Examination of Little River, Del.
79. Examination of Minisceongo River, N. Y.
80. Examination of Branford Harbor, Conn.
81. Examination of Dunkirk Harbor, N. Y.
82. Examination of Newport Harbor, Cal.
83. Examination of Erie Harbor, Pa.
216. Examination of Cheat River, W. Va. and Pa.
217. Examination of Big Sandy River, Tenn.
218. Surplus water over Govt. dams in Miss. R. between St. Paul and Minneapolis.
219. Examination of Boyce Landing, Red River, La.
220. Examination of Caddo Lake, Tex. and La.
221. Examination and survey of Duluth Harbor, Minn.
222. Examination of headwaters of Big Sandy R., including Pound R. & Russell Fork.
223. Examination of Richland Creek, Tenn.
224. Examination and survey of Shem Creek, S. C.
324. Examination of Kewaunee Harbor, Wis.
325. Examination of eastern entrance to Keweenaw Canal, Mich.
326. Report regarding wharfage privileges at Brunswick Harbor, Ga.
327. Examination and survey of Eight Mile River and East Branch, Connecticut R.
328. Examination and survey of East Pearl River, Miss. and La.
329. Examination and survey of Shaws Cove, New London Harbor, Conn.
330. Examination of Youghiogheny River to Connellsville, Pa.
346. Examination and survey of Toms River, N. J.
347. Examination of Caloosahatchee and Orange rivers, Fla.
348. Examination of Duck River, Tenn., from its mouth to Centerville.
349. Examination of Calumet River, Ill.
350. Examination of Rahway River, N. J.
351. Examination of Tenants Harbor, Me.
395. Examination of Crystal River, Fla.
396. Examination at mouth of Horn Harbor, Va.
397. Examination of Pagan River, Va.
398. Examination and survey of harbor at Duck Is., including Kelseys Pt., Conn.
399. Examination and survey of Coquille River, Oreg., at and near mouth.
400. Examination of Red River of the North, Minn. and N. Dak.

205645

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No.
401. Examination of White Oak River, N. C., from its mouth to Maysville.
402. Examination of channel from Galveston Harbor to Texas City, Tex.
403. Examination and survey of Forked River, N. J.
444. Examination of Ontonagon Harbor, Mich.
445. Waterway connecting Swan Quarter Bay with Deep Bay, N. C.
446. Examination of Queens Creek, Va., from mouth to Capital Landing Bridge.
447. Examination of channel from Peters Neck Point to Horn River, N. Y.
448. Examination of channel from Palacios to Matagorda Bay, Tex.
449. Examination of channel from Jamaica Bay to Peconic Bay, N. Y.
450. Examination for harbors of refuge on north shore of Lake Superior.
451. Examination of Totuskey River, Va.
452. Examination of Shipyard Creek, S. C.
453. Examination and survey of channel in St. Clair River, Mich.
463. Examination of Hempstead Harbor, N. Y.
464. Examination of St. Josephs Bay, Fla.
465. Statement of civilian engineers employed on rivers and harbors, 1907.
478. Examination of Bayou Courtableau, La.
479. Examination of Munising Harbor, Mich.
490. Examination of Sabine R. from mouth to Logansport, La., and Belzora, Tex.
491. Examination of shoal off Stuyvesant Harbor, Hudson River, N. Y.
493. Examination of Bois De Sioux River, Lake Traverse, and Big Stone Lake, etc.
503. Examination of channel between Threemile Harbor and Gardiners Bay, N. Y.
515. Examination of North Fork of Edisto River, S. C., from mouth to Orangeburg.
516. Examination of South Fork of Edisto River, S. C., from mouth to Scotts Bridge.
530. Examination of Little River, S. C., at its mouth.
531. Examination of Patuxent River, Md.
532. Examination of Wekiva River, Fla.
533. Examination of Arthur Kill, N. J.
556. Examination of Dry Straits, Alaska.
557. Examination of Lake Pontchartrain, La., from west end to Milneburg.
558. Examination of Guyandot River, W. Va.
559. Examination of Rocky River Harbor, Ohio.
560. Examination and survey of Black River, Lorain Harbor, Ohio.
650. Examination of Congaree and Broad rivers, S. C.
651. Examination of Saluda River, S. C., between Columbia and Hollow Creek.
652. Examination and survey of Onancock River, Va.
653. Examination of Matinicus Harbor, Me.
654. Examination and survey of Potomac River at Mount Vernon, Va.
665. Examination of channel from Pensacola Bay to Santa Rosa quarantine station.
666. Examination of Hatchee River, Tenn., up to town of Brownsville.
692. Examination of Homochitto River, Miss.

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DECKERS CREEK, WEST VIRGINIA

LETTER FROM THE SECRETARY OF WAR TRANSMITTING, WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF DECKERS CREEK, WEST VIRGINIA

DECEMBER 3, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed

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WAR DEPARTMENT,
Washington, December 2, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated November 25, 1907, together with copy of a report from Maj. H. C. Newcomer, Corps of Engineers, dated October 4, 1907, of a preliminary examination of Deckers Creek, West Virginia, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, November 25, 1907.

SIR: I have the honor to submit herewith for transmission to Congress report of October 4, 1907, by Maj. H. C. Newcomer, Corps of Engineers, on preliminary examination authorized by the river and harbor act of March 2, 1907, as follows:

Deckers Creek, West Virginia, with a view to securing for a distance of two thousand feet up from its mouth a channel and harbor with the same depth of water as in the Monongahela River where said Deckers Creek empties into said river.

From the facts and for the reasons given I concur in the opinion expressed by the local officer, the division engineer, and the Board of Engineers for Rivers and Harbors that this locality is not worthy of improvement by the General Government.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

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PRELIMINARY EXAMINATION OF DECKERS CREEK, WEST VIRGINIA.

ENGINEER OFFICE, UNITED STATES ARMY,
Pittsburg, Pa., October 4, 1907.

GENERAL: I have the honor to submit the following report of preliminary examination of—

Deckers Creek, West Virginia, with a view to securing for a distance of two thousand feet up from its mouth a channel and harbor with the same depth of water as in the Monongahela River where said Deckers Creek empties into said river—

as provided for in the river and harbor act of March 2, 1907.

A former preliminary examination of this locality was made in 1905 in pursuance of a provision of the river and harbor act of March 3, 1905, and report published in House Document No. 193, Fifty-ninth Congress, first session. This report pronounced the place unworthy of improvement by the United States, for the reason that the work proposed would practically amount to providing wharfage facilities for private interests.

Deckers Creek is a small tributary of the Monongahela River on its right bank at Morgantown, W. Va. It has a drainage basin about 15 miles long, with area of approximately 60 square miles. The course of the stream is shown on the topographic sheet of Morgantown Quadrangle United States Geological Survey. It is wholly unnavigable in its natural condition, except during higher stages of the Monongahela River, when backwater from that stream would enable boats to ascend the creek a short distance. It has comparatively little slope for 1,000 feet from its mouth, but then becomes steeper, rising about 8 feet altogether in the first half mile. The low-water depths are quite small, so that the proposed channel and harbor would have to be formed mainly by dredging and rock excavation. The Morgantown and Kingwood Railroad runs along the right bank of this portion of Deckers Creek, making a junction at its mouth with a branch of the Baltimore and Ohio Railroad, which follows the right bank of the Monongahela River.

In response to circular letters requesting information concerning the various interests involved and the character and value of the present and prospective commerce, a number of replies have been received advocating the proposed improvement as a means of providing additional transportation facilities for the products shipped from Deckers Creek valley and other territory tributary to the Morgantown and Kingwood Railroad. This line extends from Morgantown through Kingwood to Rowlesburg, traversing a region rich in coal, limestone, fire clay, glass sand, and building stone. A large production of coke and cement is expected, and there are already several manufacturing plants located on the railroad. None of these industries are in the vicinity of the proposed improvement, however, so that its only function would be to provide a navigable water front for the Morgantown and Kingwood Railroad, connecting with pool 9, Monongahela River, and thus facilitate transshipment from rail to water and vice versa. It appears that when the part of this railroad first built was put in operation satisfactory freight contracts could not be made with the Baltimore and Ohio Railroad Company, and its owners therefore did some dredging in the creek, put in chutes, and transferred sundry materials to barges for river shipment. This was

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later discontinued, and the channel then excavated has become filled with sediment from the stream.

The Morgantown and Kingwood Railroad Company has been requested to furnish information as to the amount and character of its freight movement and the proportion that might be shipped by water if a suitable harbor were provided, but it has not yet supplied any such data. One party states that there is an average of about 50 cars of freight per day. He also says that the Morgantown and Kingwood Railroad Company has a contract with the Baltimore and Ohio Railroad Company that provides for delivery to the latter of all freight that the former can control, and that this arrangement inures to the benefit of the Morgantown and Kingwood Railroad Company by reason of the fact that it receives a relatively larger percentage of the joint tariff. It is therefore claimed that the proposed improvement is not in the interest of the railroad. It is evident, however, that all commerce through the proposed harbor would have to be to or from the railroad, and the transfer could not be made except by the railroad company or some other company organized for the purpose.

The United States has assumed the cost of canalizing the entire Monongahela River, thus greatly increasing its navigable capacity at public expense. It is not understood to be the Government's policy, however, to excavate harbors for railroads or other private interests, and I have therefore to report that in my opinion this locality is not worthy of improvement by the General Government.

Very respectfully, your obedient servant,

H. C. NEWCOMER,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

ENGINEER OFFICE, U. S. ARMY, CENTRAL DIVISION,
Detroit, Mich., October 16, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army, concurring in the views and opinion of the district engineer.

G. J. LYDECKER,
Colonel, Corps of Engineers,
Division Engineer, Central Division.

[Fifth indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., November 18, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

Deckers Creek is a tributary of the Monongahela River, which it enters at Morgantown, W. Va. In its present condition the stream is wholly unnavigable except during high stages of the Monongahela River, when backwater from that stream provides a navigable depth for a short distance up the creek. The improvement of the stream for a distance of 2,000 feet, as specified in the act, would have no bearing upon the establishment of a competitive water route for

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products of the territory tributary to Deckers Creek. Its office would be to afford water communication between the Monongahela River and the railroad near the mouth of the creek.

The only preliminary examination heretofore made of this stream was one ordered by the act of March 3, 1905, of the "mouth of Deckers Creek, West Virginia, at its confluence with the Monongahela River, with a view to securing for a distance of 1,600 feet a channel with the same depth of water as in said Monongahela River, and restoring and improving the harbor destroyed by flood." In conformity with law, that report came before the Board of Engineers for Rivers and Harbors for consideration, and after careful study of available data the Board reached the conclusion that the improvement contemplated by the act would be equivalent to building a wharf or slip for the benefit of private interests, and would not benefit general commerce. At that time the invitation extended by the district officer to interested persons to submit statements and arguments to the Board met with no response; nor has the Board in the case now under consideration received any communications from interests invited by the district officer to submit their views in regard to the commercial necessity for the improvement.

As far as the Board has been able to determine, there has been no change in the conditions reported in 1905 which would warrant a reversal of the opinion then expressed, and in view of those conditions, which indicate that the benefits of the work inure solely to certain private or corporate interests and would have no influence upon general commerce, the Board unites with the district officer and the division engineer in the opinion that Deckers Creek is not worthy of improvement by the United States.

For the Board:

R. L. Hoxie,
Colonel, Corps of Engineers,
Senior Member Present.

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BEECH RIVER, TENNESSEE

LETTER FROM THE SECRETARY OF WAR TRANSMITTING, WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF BEECH RIVER, TENNESSEE

DECEMBER 3, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed

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WAR DEPARTMENT,
Washington, December 2, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated November 25, 1907, together with copy of a report from Maj. W. W. Harts, Corps of Engineers, dated October 28, 1907, of a preliminary examination of Beech River, Tennessee, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, November 25, 1907.

SIR: I have the honor to submit herewith for transmission to Congress report of October 28, 1907, by Maj. W. W. Harts, Corps of Engineers, on preliminary examination of Beech River, Tennessee, authorized by the river and harbor act approved March 2, 1907.

From the facts and for the reasons given, I concur in the opinion expressed by the local officer, the division engineer, and the Board of Engineers for Rivers and Harbors that Beech River is not worthy of improvement by the Federal Government at the present time.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

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PRELIMINARY EXAMINATION OF BEECH RIVER, TENNESSEE.

ENGINEER OFFICE, UNITED STATES ARMY,
Nashville, Tenn., October 28, 1907.

GENERAL: In accordance with the instructions of your letter of March, 14, 1907, I have the honor to submit the following preliminary report on Beech River, Tennessee, as required by the provisions of the act of Congress approved March 2, 1907. Beech River was examined by me at several points in October, 1907.

Location and description.—Beech River is a small, unimportant creek rising in Henderson County, Tenn., near Lexington, flowing southeasterly through Henderson and Decatur counties, and emptying into the Tennessee River near Perryville, Tenn., about 135 miles above Paducah, Ky.

The elevation of low water at the railroad bridge near Lexington is reported by the railroad company to be 415 feet. The elevation of low water in the Tennessee River at Perryville is 323 feet. The fall from Lexington to Perryville is thus seen to be 92 feet. The entire length of the river is reported to be about 125 miles. The average fall is probably much less than 1 foot to the mile, especially in its lower reaches, where it is very flat. Its drainage basin covers an area of approximately 270 square miles. Its low-water flow is estimated at not to exceed 50 cubic feet per second at the mouth. Its average low-water width in the lower portions, where it is affected by the backwater of the Tennessee River, varies from about 30 to 100 feet, and in the shoal places the depth of water is often but a few inches.

Its course is very winding. It is reported that occasionally bends are found where the distance across by land is but a mile or two, whereas the distance by river is perhaps half a day's journey by skiff. It flows through a rolling country, much of which is unimproved and still covered with timber. The main obstructions in the river to any navigation are the excessive bends and the large number of snags.

The records do not show that any former examination has been made of this stream.

Counties affected.—Beech River flows through Henderson and Decatur counties. The population of these counties, as given by the census report of 1900, is as follows:

County.	Area, square miles.	Population.	Average density of population per square mile.
Henderson	515	18,117	35.1
Decatur	287	10,489	36.0

The density of population of New York in 1900 was 152.6; of Pennsylvania, 140.1; of Tennessee, 48.4.

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The total assessed wealth, including real, personal, and other property, was as follows:

County.	Wealth.	Per capita wealth.
Henderson	$1,640,424	$90.00
Decatur	853,327	81.74

The per capita assessed wealth of the United States is given as $448.33 in 1900.

The main towns along the river are Perryville (at the mouth), Decaturville (county seat of Decatur County), Darden, and Lexington (county seat of Henderson County). The population of these towns is approximately 200 for Perryville, 600 for Decaturville, 300 for Darden, and 1,332 for Lexington.

The country through which Beech River flows is still sparsely populated and undeveloped. The only use that could be expected of this stream, if improved, would be confined to the rafting of timber products, as no steamboats have ever been able to enter the river on account of its narrowness and excessive bends.

Commercial statistics.—During the past year it is reported that from two to three million feet of gum and poplar logs were rafted out, valued at about $15,000. No other use of the river has been reported.

The valley of Beech River is undeveloped, and in the vicinity of the stream is largely uncultivated and covered with timber. The amount of traffic that would use an improved river it is impossible to predict, but it would unquestionably be very small and out of all proportion to the cost of any adequate improvement.

Improvements practicable.—Owing to the winding character of this stream, its low banks, its narrowness and small low-water flow, and its frequent shoals, it is not believed that it will ever be practicable to make it navigable for any considerable steamboat navigation at reasonable expense. Clearing out snags and cutting overhanging trees in the portions affected by the backwater of the Tennessee River might be of some assistance, but the cost of this work would be far in excess of the benefits to be received therefrom.

Recommendation.—In view of the foregoing I give it as my opinion that the Beech River is not worthy of improvement by the Federal Government at the present time.

Very respectfully,

WM. W. HARTS,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

OFFICE DIVISION ENGINEER, GULF DIVISION,
New Orleans, La., October 31, 1907

Respectfully forwarded to the Chief of Engineers, U. S. Army, concurring in the recommendation of the district engineer, as given within.

E. H. RUFFNER,
Colonel, Corps of Engineers,
Division Engineer.

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[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., November 18, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

Beech River is a small and unimportant tributary of the Tennessee River, into which it empties near the town of Perryville, Tenn. No preliminary examinations of this stream have heretofore been made by the United States, and the information available to the Board is wholly contained in the within report.

The stream is about 125 miles in length, and varies in width from 30 to 100 feet. Its fall from its source to its mouth is 92 feet, and its low-water discharge about 50 cubic feet per second. The course of the stream is much impeded by excessive bends and a large number of snags.

The territory tributary to Beech River is undeveloped and sparsely populated, much of it being still covered with timber. It appears that no steamboats have ever been able to enter the river on account of its narrowness and excessive bends. Even if the river were improved as proposed, it is improbable that a steamboat commerce of any importance would develop, and the usefulness of the stream would therefor be practically confined to the rafting of timber. On the lower portion of the river which is affected by the backwater of the Tennessee River, it might be possible to improve existing conditions by the removal of snags and the cutting of overhanging trees, but the Board believes that the cost of this work would exceed the value of any benefits which it might be expected to afford.

In view of the above and of the more complete analysis of conditions contained within, the Board concurs with the district officer and the division engineer in the opinion that Beech River is not worthy of improvement by the Federal Government at the present time.

Interested parties were invited by the district officer to submit statements and arguments to the Board in behalf of the improvement, but no communications of this character have been received.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 69.

BLAINE HARBOR, WASHINGTON.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF BLAINE HARBOR, WASHINGTON.

DECEMBER 5, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 4, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated June 8, 1907, together with copy of a report from Maj. H. M. Chittenden, Corps of Engineers, dated April 11, 1907, of a preliminary examination of Blaine Harbor, Washington, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, June 8, 1907.

SIR: I have the honor to submit herewith report of April 11, 1907, by Maj. H. M. Chittenden, Corps of Engineers, on preliminary examination of Blaine Harbor, Washington, ordered by the river and harbor act approved March 2, 1907.

Blaine Harbor has a deep and commodious entrance, admirably protected from prevailing winds; but access to the harbor front is cut off by tide flats, making it necessary to build long wharves. The improvement desired is the dredging of a channel through these tide flats, so that vessels can approach nearer the town.

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With the information at hand the district officer is unable to arrive at a conclusion as to whether it is advisable that the desired improvement should be undertaken by the General Government, and he recommends a survey, as provided for by law, in order to secure the necessary additional information.

For the reasons given in its report of May 27, 1907, herewith, the Board of Engineers for Rivers and Harbors expresses the opinion that it is not advisable for the United States to undertake the work proposed at Blaine Harbor and does not concur in the recommendation of Major Chittenden that a survey be made.

I concur in the adverse views of the Board, and will add further that the desired improvement is in the nature of providing terminal facilities for the water-borne commerce at Blaine rather than of completing part of the through channel. As such it should, in my opinion, be provided by the local interests rather than by the General Government. It is recommended, therefore, that no survey be made in this case and that this report be transmitted to the Public Printer and printed as authorized by section 3 of the act of March 2, 1907.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers,
U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF BLAINE HARBOR, WASHINGTON.

UNITED STATES ENGINEER OFFICE,
Seattle, Wash., April 11, 1907.

GENERAL: Complying with instructions contained in your circular letter of March 14, 1907, I have the honor to submit the following report of a preliminary examination of Blaine Harbor, Washington:

A public hearing was held in Blaine on the 4th instant and a personal examination made of the harbor.

The city of Blaine is estimated to possess a population of about 4,000 people. It is situated in the northwest corner of the State of Washington and borders directly upon the British line. Its chief industries are fish and timber products. The fishing industry for the year 1905 amounted to over 12,000 tons of exported fish products, worth nearly $2,000,000. The timber product for 1906 consisted of something over 120,000,000 feet of logs and about 43,000,000 feet of lumber, the estimated value of which is about $7,500,000. There is also a considerable traffic in general merchandise. There were nearly one thousand vessels entering the harbor during the year 1906, with a tonnage varying from 5,000 to 3,000 tons. About 70 per cent of the business is done in vessels under 100 tons net tonnage. The port is an important one in the fishing business and will continue to be an important one in the timber business for many years to come.

In recent years the Navy has held target practice in the vicinity of Blaine Harbor and has had considerable occasion to enter the harbor and land at the wharves for various purposes. Whether this arrangement will be permanent is not known, but the situation is considered a favorable one for target practice.

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The harbor of Blaine is inclosed by a long sand spit, which completely protects it from the prevailing winds. The great difficulty experienced arises from the fact that the tidelands extend far out into the harbor, making it necessary to build wharves about a mile long in order to reach deep water. The shoal portion of the bay breaks off very quickly into deep water when the limit of the tide flats is reached. It is the desire of the people of Blaine to have one of the State waterways dredged inshore, so that vessels can approach nearer to town, and this constitutes the purpose of the survey and examination asked for in the recent river and harbor act.

I am of the opinion that a waterway such as is desired would be of great advantage to the commercial interests of this port; but I can not state, without further information as to cost, and as to local aid in making a dredged channel available for commerce, whether or not the desired improvement would be advisable. I recommend that I be authorized to make a survey of the harbor and submit my conclusions later. An additional reason for the survey is the fact that this office has no official map of Blaine Harbor and one is necessary in connection with the general supervision of the Sound for navigation purposes.

The cost of the survey is estimated at $500.

Very respectfully, your obedient servant,

H. M. CHITTENDEN,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.

[Sixth Indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., May 27, 1907.

Respectfully returned to the Chief of Engineers, United States Army.

In accordance with the recommendation of the Board, * * * the district officer has procured from the Chamber of Commerce of Blaine a paper setting forth the reasons of those interested for advocating the improvement of this harbor, and the Board has given careful consideration to the statements and arguments contained therein.

The desires of those interested are indicated in the following extract from the statement of the Chamber of Commerce:

As for the matter of maintaining a dock across the tide flats, it would probably be a necessity, however inconvenient, even if we had the additional wharfage which would be afforded by dredging the waterway. It should be stated that the maintenance of these docks is a very great expense on account of the destruction of the piling by teredos, and if the wharfage along the waterway should prove sufficient for the needs of this port it would be more than a mere convenience. But whether the wharf across the tide flats is maintained or not, it affords and could afford no adequate facilities. The city controls a street 80 feet wide whereon the present wharf is maintained, and the land on either side is controlled by private concerns. But one vessel can moor at this dock at a time; and the dredging of the waterway at the present time as affording a wharfage is an absolute necessity to the traffic of this place, not a mere convenience.

There are, however, other reasons why the waterway is a necessity. The first of these is that our present deep-water frontage is all utilized by industries, and although we are now maintaining a dock across the tide flats we have no facilities for loading or unloading vessels nor for mooring craft except the

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inadequate and temporary one afforded by our wharf. (We do not consider the private wharves owned by local manufacturing plants, as these are reserved for their own use.) * * *

Nearly all the traffic here is done on vessels of less than 100 tons, and while our harbor is landlocked, yet these smaller vessels require a better shelter than even our snug little harbor affords. A waterway would give us this necessary shelter.

The above describes very clearly the conditions now existing at Blaine Harbor. The improvement desired does not pertain to the harbor proper, but contemplates the dredging of an artificial waterway across tide flats bare at low water, and situated wholly within the limits of the city of Blaine, for the purpose of affording additional water front where facilities for loading and unloading vessels can be provided and maintained at minimum cost. It is stated that the accessible deep-water frontage, consisting of 2,000 feet, is all taken up by industries, which would seem to indicate that existing wharf sites are suitable in character, though insufficient in extent.

The principal difficulty at this harbor appears to arise from the fact that the city has not retained for public uses a sufficient area of the water front to accommodate wharves for its general shipping. Additional water front and additional docks are needed, and the proposed artificial waterway would afford these. Its construction, however, would appear to be equivalent to furnishing an immense slip or dock, which is a work properly developing upon the interests directly concerned, the facilities being those pertaining to the loading and unloading of vessels and not to the necessities of navigation. The Board does not believe that Congress contemplates entering upon the construction of a purely artificial slip or basin for the purposes defined in this instance, and in its opinion such work is not a proper object for the expenditure of public funds, though it recognizes that the improvement proposed would be valuable to local interests and might advantageously be executed by them.

The question of providing additional mooring facilities and shelter for small boats where nature has done so much does not appear to be of sufficient importance to warrant consideration as reasons for undertaking an improvement of the character now proposed.

For these reasons the Board is of the opinion that it is not advisable for the United States to undertake the work proposed at Blaine Harbor, and it is unable to concur with the district officer in his recommendation that a survey of the locality be authorized.

For the Board:

D. W. Lockwood,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 70.

CANAL CONNECTING PUGET SOUND WITH GRAYS HARBOR, WASHINGTON.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION FOR SHIP CANAL CONNECTING PUGET SOUND WITH GRAYS HARBOR, WASHINGTON.

DECEMBER 5, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 4, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated June 14, 1907, together with copy of a report from Maj. H. M. Chittenden, Corps of Engineers, dated April 11, 1907, of a preliminary examination for ship canal connecting Puget Sound with Grays Harbor, Washington, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, June 14, 1907.

SIR: Under authority conferred by section 3 of the river and harbor act approved March 2, 1907, I have the honor to submit herewith, for transmission to the Public Printer, report of April 11, 1907, by Maj. H. M. Chittenden, Corps of Engineers, on preliminary examination ordered by said act of March 2, 1907, for a ship canal connecting the waters of Puget Sound with Grays Harbor, Washington.

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For the reasons given, I concur in the opinion of the local officer and the Board of Engineers for Rivers and Harbors that it is not advisable for the United States to undertake this improvement at the present time.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION FOR SHIP CANAL CONNECTING PUGET SOUND WITH GRAYS HARBOR, WASHINGTON.

UNITED STATES ENGINEER OFFICE,
Seattle, Wash., April 11, 1907.

GENERAL: I have the honor to submit the following report on a preliminary examination of the proposed canal joining the waters of Puget Sound with those of Grays Harbor, in compliance with your circular letter;

On March 29, in Aberdeen, on Grays Harbor, I gave a public hearing to those interested in the canal question. It was participated in only by representatives from Olympia, as no other locality has shown any interest in the question. To give the Olympia interests a full opportunity to present such facts as they desire I have invited the Chamber of Commerce to submit a supplementary statement if they choose to do so.

In regard to the proposed waterway, I find that it has been talked of more or less ever since the country began to fill with settlers. As a general thing, however, the proposition has been rather for a canal from Puget Sound to the Columbia River than for one to Grays Harbor. There have been numerous resolutions by public bodies and Government officials favoring the canal. The first official reference to the subject seems to have been by Jefferson Davis, when Secretary of War, who recommended the building of a canal from Puget Sound to the Columbia. In the Republican platform of 1898 there was a resolution favoring a canal connecting Puget Sound with both the Columbia and Grays Harbor. In 1895 the house of representatives of the State legislature sent a memorial to Congress asking for a canal from Puget Sound to Grays Harbor and to the Columbia. A similar memorial was submitted by the State senate in 1893. In 1900 the Seattle Chamber of Commerce passed a resolution urging the State delegation in Congress to secure an appropriation for a canal between Puget Sound and Grays Harbor. A similar resolution was passed about the same time by the Tacoma Chamber of Commerce. In 1905 the Portland Chamber of Commerce passed a resolution urging the favorable consideration by Congress of a canal from Puget Sound to Grays Harbor and to the Columbia River.

It will thus be seen that the question has had a good deal of favorable public consideration in a general way, but, so far as I can find, without any definite knowledge of what the project actually meant and what it would cost or what its commercial value would be. No surveys have ever been made and no definite data collected to throw any real light upon the question. A considerable amount of litera-

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ture has been published dealing with the subject on purely general lines, but nothing of a definite or specific character. I have therefore had to formulate my views as best I could from personal observation and investigation.

The canal if built would leave Puget Sound in the vicinity of Olympia, pass over the divide via Black Lake (a tributary of the Chehalis River), and thence down the valley of the Chehalis to Grays Harbor. The actual distance over which the canal itself would have to be built would be more than 40 miles. The rest of the distance, on the Grays Harbor side, could probably be covered by dredging the Chehalis River. The summit level is about 150 feet above low tide, and the number of locks required should not be less than 7 on each side, making 14 in all. The quantity of water required at the summit would probably be not less than 300 cubic feet per second, if the canal were used at all, and the problem of finding that quantity of water during the dry season would be a rather serious one. There is no stream of sufficient capacity in the neighborhood and a feeder would have to be brought many miles. While the precipitation in this section of the country is large, there is annually a dry season of two or three months, during which the streams become very low, and ample provision for water, either by storage or by a long feeder, would be required.

The cost of the proposed canal, if it is to be given dimensions which will be of any value in accommodating ocean shipping, must necessarily be very large, considering the number of locks, the length of the canal, and the requirements for water supply. I should judge that it could not be less than $15,000,000 and might possibly be as great as $20,000,000.

The use which such canal would be put to, supposing it to be built, is entirely problematical; from all information available it would seem to be very slight. The great staple of commerce in the Grays Harbor country is timber products. Of course, it can not be expected that the canal would be used for timber shipments, inasmuch as timber is not shipped between Grays Harbor and Puget Sound. Timber products from Grays Harbor go by boat, foreign or coastwise, or by rail to eastern points, and the same is true of Puget Sound. The canal could not be used for logging operations. In regard to common articles of commerce, such as groceries, hardware, etc., nothing, of course, would be shipped from Grays Harbor to Puget Sound, and I find that Grays Harbor receives a large part of these staples for its ordinary use from San Francisco, in vessels that come to load with lumber at the Grays Harbor ports. Products of this class are even shipped as far inland as Chehalis and Centralia.

It therefore appears that there is very little in the line of commercial reuirements between Grays Harbor and Puget Sound that would justify the construction of a ship canal or of any canal whatever at the present time. I believe that the people of Olympia, who are the chief advocates of the measure, admit that the local traffic would be of small importance, but they base their main argument upon the saving in time to ocean shipping coming into Puget Sound. In this matter they are wholly mistaken and nothing whatever of their expectations would be realized if the canal were built. I find that the time taken for a vessel coming from San Francisco to the principal port in Puget Sound would be twenty hours longer via the

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canal than by going around the regular route through the Straits of Juan de Fuca. It is difficult to estimate the time that it would take sailing vessels to go by either route, but it is quite clear that the time would be shorter via the straits than via the canal. Furthermore, it is no uncommon occurrence for vessels in Grays Harbor to be storm bound for two weeks in trying to get to sea.[a] No such extensive delay ever occurs in the Straits of Juan de Fuca. While the latter straits are, to some extent, dangerous to navigation the dangers are of a character that can be largely removed by proper safety devices near the entrance to the straits. It is doubtful whether any storm that would make the entrance to the straits dangerous would not prohibit altogether the entrance of a loaded vessel into Grays Harbor.

It appears, therefore, that the argument in favor of a short route via the proposed canal, as an element in favor of shipping coming to Puget Sound or going therefrom, is a wholly mistaken one and I doubt if the canal would ever be used to any extent by the larger ocean-going vessels. It is possible that it might be used to some extent by very small vessels.

Considerable stress was laid, in the arguments presented at the public hearing, upon the military value of the proposed canal, but the ideas advanced were only of the most vague and general character and without any intelligent grasp of the strategic relations of the canal to the defenses of Puget Sound. It is difficult to see how a canal connecting Puget Sound with an exposed and unfortified harbor on the coast could be of any material value in time of war. It is entirely probable that a canal connecting Puget Sound with the Columbia River, affording an inner line of water communication behind two great systems of fortifications, might be of very great value in the event of hostilities on this coast. Such a canal, however, could not be considered advisable on military grounds alone.

Taking everything into consideration, it is evident that this project is not one of any pressing necessity or importance at the present time. The immense sum of money required to build it could better be expended in improving the existing harbors and navigable streams in the State of Washington. It is possible that in time with the further development of the country a canal connecting the Sound with the Columbia River, with a branch to Grays Harbor, may become a commercial necessity, but it is not so now and is not likely to be for many years to come. I have the honor to report, therefore, that this proposed work is not worthy of favorable consideration by the Government and to advise against the expenditure of any money for further surveys.

Very respectfully, your obedient servant,

H. M. CHITTENDEN,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.

[a] Illustrating this point is the following press dispatch from Hoquiam, dated April 6, 1907:

"Sixteen craft are lying at anchor in the lower harbor, tossed about by the heavy gales, awaiting a chance to put to sea. Six steamers are among the lot, while several have been reported outside awaiting a chance to get in."

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[Second indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., June 3, 1907.

Respectfully returned to the Chief of Engineers, United States Army.

The question of connecting the waters of Puget Sound with Grays Harbor, or with the Columbia River, has been vaguely considered and discussed for many years, but the item in the river and harbor act of March 2, 1907, calling for a preliminary examination of "ship canal connecting the waters of Puget Sound with Grays Harbor" is the first Congressional legislation on the subject.

The information furnished by the district officer may be briefly summed up as follows:

The proposed improvement would require actual canal construction for a distance of about 40 miles, while the work for the remainder of the distance would consist of dredging in existing waterways. The summit level is about 150 feet above tide water, and about 14 locks, 7 on each side, would be required. The water supply is uncertain, and its sufficiency is questioned. The cost of the canal would be very great, probably between $15,000,000 and $20,000,000. Lumber is the principal product of the country, and it can hardly be expected that this would be shipped to any great extent through the canal, as that originating on or tributary to Grays Harbor or Puget Sound would naturally be shipped direct from the nearest port; and it appears that but little if anything would be gained by the construction of the canal so far as this item of commerce is concerned. Considerable stress seems to have been laid by interested parties on the use of the canal for military purposes in time of war and in lessening the time and distance for vessels bound to or from Puget Sound by avoiding the necessity of going through the Straits of Juan de Fuca. In analyzing these points the district officer concludes that from a strategic point of view the canal would not be of great value, and as a saving in ships' time the argument is not well founded, as a longer time would be required to traverse the canal than to take the regular course.

By invitation of the district officer, interested persons have submitted to the Board through Hon. John D. Atkinson, attorney-general of the State of Washington, a statement covering their views in regard to the advantages to be derived from the construction of the canal. They seem to be under a misapprehension regarding the results of the preliminary examination, believing that the district officer estimated the altitude of the crest of the divide at 200 feet and that 20 locks—10 on each side—would be required. They claim that the elevation is not over 125 feet, and that not more than 12 locks would be required, thus indicating a vast difference in the assumed estimate of the district officer and their own; whereas the district officer estimated the elevation of the summit level at 150 feet and the number of locks at 14, not differing greatly from the views expressed in the statements submitted. Assuming the estimate of the height of the summit level and the number of locks required to be as estimated by interested parties, the cost of the canal would still be very great, and the cost of maintenance and operation would be large.

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The amount of commerce to be benefited by the proposed improvement is entirely prospective. It appears from the report of the district officer that residents of Olympia have the greatest interest in the proposed canal, and that those doing business on Grays Harbor expressed no desire for the improvement nor evinced any interest in the matter. The entire commerce of Olympia Harbor is reported at about 60,000 tons. If all of this commerce, together with a large part of that of Grays Harbor, and a considerable amount of undeveloped commerce between Grays Harbor and Puget Sound were to make use of the canal, if constructed, the cost of the improvement would still be greatly disproportionate to any probable benefit that might reasonably be expected to accrue to the general public.

Having carefully reviewed the information at hand, the Board has arrived at the conclusion that the commercial interests, present and prospective, to be benefited by the construction of a canal connecting the waters of Puget Sound with Grays Harbor are not of sufficient importance to justify the large outlay required, and it concurs with the district officer in the opinion that it is not advisable for the United States to undertake the improvement.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 71.

AU SABLE RIVER, MICHIGAN.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF AU SABLE RIVER, MICHIGAN.

DECEMBER 5, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 4, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated June 28, 1907, together with copy of a report from Col. C. E. L. B. Davis, Corps of Engineers, dated May 29, 1907, of a preliminary examination of Au Sable River, Michigan, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, June 28, 1907.

SIR: Under authority conferred by section 3 of the river and harbor act approved March 2, 1907, I have the honor to submit herewith for transmission to the Public Printer report of May 29, 1907, by Col. Chas. E. L. B. Davis, Corps of Engineers, on preliminary examination ordered by said act of Au Sable River, Michigan, with a view to obtaining a depth of 10 feet.

Work of improving Au Sable River has been carried on heretofore at various times by the General Government, but for the reasons given I concur in the opinion expressed by the district officer, by the division engineer, and by the Board of Engineers for Rivers and

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Harbors that the locality is not worthy of improvement in the manner proposed.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF AU SABLE RIVER, MICHIGAN.

UNITED STATES ENGINEER OFFICE,
Detroit, Mich., May 29, 1907.

GENERAL: 1. I have the honor to submit the following report upon the preliminary examination of Au Sable River, Michigan, with a view to obtaining a depth of 10 feet, as called for by Department letter of March 14, 1907.

2. Attempts to improve the Au Sable River commenced in 1867 with an appropriation of $50,000 in the river and harbor act of March 2, 1867, to carry out a project of Gen. William F. Raynolds for the improvement of its mouth. Since that time and up to and including the river and harbor act of August 2, 1882, a total of $114,970 has been appropriated, and up to June 30, 1892, $114,786.12 had been expended, at which date further attempts at improvement apparently ceased.

3. Before beginning the improvements the river was 150 feet wide at the mouth, with a depth of 5 feet over the bar, while above the mouth there was a depth of 7 to 10 feet for a distance of a quarter of a mile, beyond which point only 5 to 6 feet could be found. In the last report on this improvement, submitted by Col. O. M. Poe, Corps of Engineers, in his annual report for the fiscal year ending June 30, 1892, he states:

> The present project for the improvement of the harbor was adopted in 1866 and modified in 1879, the object being to obtain a channel of not less than 10 feet in depth for a width of 100 feet from Lake Huron to the State Road Bridge at Au Sable.
>
> The money heretofore expended on this improvement has given temporary results only, and a permanent channel can not be secured except at so great a cost as to be disproportionate to the benefits to be obtained.
>
> The shipments from this port are large and important, but are principally made from private piers built into the lake entirely outside of the harbor. Were there a fair prospect of securing a permanent improvement at a reasonable cost, I would take pleasure in recommending further appropriations for this harbor, but can not clearly see my way to doing so.

4. Many surveys and examinations of this harbor have been made at various times. An examination was made in 1888 under the direction of Colonel Poe for a 12-foot channel and breakwater ordered by act of August 11, 1888. In his report Colonel Poe reiterates his former opinion that a permanent improvement of the harbor at any cost at all commensurate with the advantages to be gained is impossible, and finds himself unable to reach any other conclusion than that the uncertainty of success does not warrant the expenditure of as large a sum as the project calls for, and gives it as his opinion that the harbor is not worthy of improvement by the General Government.

5. In his annual report for the fiscal year ending June 30, 1868, General Cram, then in charge of the work, states that this would

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always be an expensive harbor to keep open, owing to the great quantities of sand coming down the river, and this forecast, before much progress had been made in the work of improvement, has been amply fulfilled by subsequent experience.

6. In 1880–81 a pile and edging revetment of both banks of the river was constructed, but in the fall of the latter year 150 feet of it was wrecked. I made an examination of this harbor on May 23, 1907, and found that the revetment had nearly all disappeared, only a few round piles remaining to show where it had originally been constructed. Owing to the increased cost of timber, such a revetment would not now be built, as continual dredging would be cheaper than to maintain such a structure.

7. I do not think any further surveys of this river are needed, as I can not see how any information can be obtained that would furnish any better basis for an opinion of the practicability of its improvement than the long experience gained by attempts to improve it, extending over a period of a quarter of a century; that is, from 1867 to 1892, when all attempts at improvement ceased.

8. I am therefore of the opinion that experience has amply shown that no permanent improvement of this river can be made at a figure at all commensurate with the amount of commerce to be benefited, nor do I think the amount of commerce great enough to warrant the expense of continual dredging, which seems to be about the only method that promises to give the required depth of 10 feet, and I therefore do not regard the river worthy of improvement by the General Government.

9. As to the amount of commerce that would be benefited by the improvement of the river, attention is respectfully invited to the appended copy of a letter received from Mr. A. K. Weir, deputy collector of customs of the subport of Oscoda, opposite the town of Au Sable, on the north side of the river.

* * * * *

Very respectfully, your obedient servant,

CHAS. E. L. B. DAVIS,
Colonel, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

ENGINEER OFFICE, U. S. ARMY, CENTRAL DIVISION,
Detroit, Mich., June 8, 1907.

Respectfully forwarded to the Chief of Engineers, United States Army, concurring in the views expressed by the district engineer in paragraph 8 within.

G. J. LYDECKER,
Colonel, Corps of Engineers,
Division Engineer, Central Division.

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[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., June 24, 1907.

Respectfully returned to the Chief of Engineers, United States Army.

Au Sable River empties into Lake Huron about 15 miles north of the port of Tawas. Work for its improvement was in progress between 1867 and 1892, under a project providing for the construction of two parallel piers of cribwork, 100 feet apart, extending out from the shore line sufficient distance to provide a depth of 10 feet. The estimated cost of this work, as determined in 1867, was $69,367. In 1892, when operations ceased, $114,786.12 had been expended.

The within report describes the efforts made to establish a navigable entrance channel at the mouth of this river and the difficulties attending the work. Au Sable River carries in suspension immense quantities of sand which, being washed down for a distance of 120 miles, form continual deposits at the mouth. The history of the improvement, as recorded in the Annual Reports of the Chief of Engineers, indicates that the expenditures made gave only temporary relief. The fact that permanent results could not be expected was recognized at the inception of the improvement, and in 1872 the officer in charge stated, "I shall not, as heretofore, make an estimate for completing the work, as I now see no prospects of ever being able to say that it is satisfactorily completed." The last appropriation for the river was made in 1882. But little work was thereafter done on the permanent improvement, and the pier construction appears to have been definitely abandoned when by the act of August 11, 1888, it was directed that the "balance available from former appropriations shall be expended in dredging at the mouth of Au Sable River."

In a report on preliminary examination, submitted by Col. O. M. Poe, Corps of Engineers, under date of December 26, 1888, the following statement appears:

> The present bar at the mouth can be removed by dredging, only to be formed again within a few months. If the piers be extended, the only effect will be to move the bar from its present position to another having the same relation to the new pierheads that the existing bar does to the existing piers. The temporary character of the improved channel does not warrant the expenditure upon it of any considerable sum, and the river is therefore, in my opinion, not worthy of improvement by the General Government.

The commerce pertaining to this river in former years was stated to consist largely of lumber and salt. While the amount of this commerce was considerable, it was principally carried over private piers built into the lake entirely outside of the harbor. From information accompanying the report of the district officer it appears that a number of vessels entering the port are engaged in the fish business, and that one vessel is employed in the transportation of fruit, vegetables, and grain products. The commerce during 1906, exclusive of lumber, is reported to have a valuation of about $40,000.

Interested parties having been invited by the district officer to submit statements to the Board, a communication has been received from the Au Sable and Oscoda Business Men's Association which has been duly considered. It is recognized that the commerce of the river is now limited, and the improvement is principally urged for its value

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to prospective commerce in furnishing an outlet for forest and farm products, and affording a harbor sufficiently protected to offer facilities favorable for the establishment of manufactories.

In view of the physical obstacles to a satisfactory permanent improvement of the mouth of Au Sable River, and the cost of maintaining by dredging a channel suitable to the needs of navigation, the Board is of the opinion that the present and prospective commerce involved is insufficient to justify further improvement at this locality. It therefore concurs with the district officer and division engineer in the opinion that this river is not worthy of improvement by the General Government with a view to obtaining a depth of 10 feet.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

LETTER OF A. R. WEIR, DEPUTY COLLECTOR OF CUSTOMS.

UNITED STATES CUSTOMS SERVICE,
OFFICE OF THE DEPUTY COLLECTOR,
Subport of Oscoda, March 25, 1907.

SIR: Your letter of the 22d instant, with copy of letter of the 6th instant, received. Your letter of the 6th instant was received and either mislaid or lost. I have been endeavoring for some time to get the information your office desired and it seems to be an impossibility to get a detailed statement of the amount and value of the commerce of Au Sable covering the last three years, the reason being that about all the business done was by the fish companies, and they are not very good bookkeepers.

Some seven or eight years ago the commerce of the Au Sable River was of importance to this port. Vessels loaded to a depth of 12 feet cargoes valued at several thousand dollars each, but owing to the sand bar which formed at the mouth of the river this business had to be discontinued.

For the last four years there has not been more than 3 feet of water on the bar, except a narrow and crooked channel which was kept open by the fishing vessels to a depth of 5 feet. The following is the approximate value of the river commerce during the last three years:

A small trading vessel called the *Durkee*, owned by E. Davis, and which plied between Port Austin, Caseville, Bay Port, and Au Sable, carrying fruit, vegetables, and grain products; the value of business carried during 1906 was	$12,000.00
J. H. Spencer, 1906 (fish)	2,000.00
Au Sable Fish Company, 1906 (fish)	11,802.22
J. E. Betz, 1906 (fish)	8,500.00
G. E. Colbath, 1906 (fish)	5,706.10
Total	40,008.32

During 1904–5 the Au Sable Fish Company shipped fish to the value of $29,175.06, J. E. Betz during the same period to the value of $14,000, G. E. Colbath during the same period to the value of $11,789.

There are four other parties fishing out of this river, from whom at this time I am unable to get a statement; will, however, get one within a short time. If this bar at the mouth of the river was removed the commerce of Au Sable River would increase very rapidly. Two or three fishing companies are very anxious to get in here at the present time, as well as the small lumber-carrying vessels.

Another very important matter to be considered is that there is no shelter at this port for the vessels in the lumber trade during bad weather, and considerable damage and loss has been occasioned by vessels of this class being forced to run to Tawas Bay for shelter, whereby if they could move into the

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Au Sable River for shelter or for the purpose of loading all the danger would be over.

The fishermen inform me that the depth of water inside the bar is from 10 to 12 feet, and that this depth of water continues for quite a distance up the river. The parties most interested in this matter besides the fishermen are the H. M. Loud's Sons Company, Au Sable; I. Lincoln, and the Huron Fish Company, of Alpena, Mich.

I shall endeavor to furnish a further report in a short time.

Respectfully, yours,

A. R. WEIR, *Deputy Collector.*

Mr. GEO. E. FAIRBAIRN,
Chief Clerk, United States Engineer Office, Detroit, Mich.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 72.

GRAND RIVER, MICHIGAN.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF GRAND RIVER, MICHIGAN.

DECEMBER 5, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 4, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated June 15, 1907, together with copy of a report from a Board of Engineer officers, dated May 29, 1907, on an examination of Grand River, Michigan, made in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, June 15, 1907.

SIR: Under authority conferred by section 3 of the river and harbor act of March 2, 1907, I have the honor to submit herewith for transmission to the Public Printer report of the Board of Engineer officers ordered by the said act, dated May 29, 1907, on an examination of Grand River, Michigan, with a view to the regulation of the floods in the interest of navigation.

The Board finds in substance that navigation is not interested in the regulation of the floods in Grand River, and that the selection of a project for protection against flood damage is a matter for local determination.

The report has been submitted, as required by law, to the Board of Engineers for Rivers and Harbors, created by section 3 of the

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river and harbor act of June 13, 1902. This Board, in report dated June 10, 1907, concurs in the conclusions of the special Board, and, being required by law to state its opinion as to the advisability of commencing improvements upon which its reports are asked, it states that it is not advisable for the United States to undertake any improvement of the river with a view to the regulation of floods in the interest of navigation.

I concur in the view expressed by the Board which made the examination that, under the wording of the item which presents the matter for its consideration, no duty devolves upon it to devise any plan for the regulation of the floods in the river.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

REPORT OF A BOARD OF ENGINEERS ON EXAMINATION OF GRAND RIVER, MICHIGAN, WITH A VIEW TO THE REGULATION OF FLOODS IN THE INTEREST OF NAVIGATION.

DETROIT, MICH., *May 29, 1907.*

GENERAL: The Board of officers constituted under the provisions of Special Orders, No. 8, Office of the Chief of Engineers, current series, for the purpose of making the examination of Grand River, Michigan, called for by the river and harbor act approved March 2, 1907, has the honor to report as follows:

PROCEEDINGS.

Pursuant to the call of the senior member, the Board met at the United States Engineer Office, Grand Rapids, Mich., at 1 p. m., April 15, 1907, and there considered documentary and other evidence pertaining to flood conditions on the Grand River. On April 16, in company with the city engineer and the head of the department of public works of Grand Rapids, the Board inspected the reach of the Grand River from the Wealthy Avenue Bridge north to Ann street. On the same day a previously announced public hearing was held in the council chamber of the city hall, at which all concerned were invited to freely express their views, and many did so. On April 17 the Board again met at the United States Engineer Office in Grand Rapids for further discussion and on the same day adjourned, pending the preparation of certain drawings and other data. Pursuant to adjournment and under the provisions of Special Orders, No. 18, Office of the Chief of Engineers, current series, the Board met again at Detroit, Mich., at 10 a. m., May 27, and after considering the further data before it, proceeded to Grand Rapids, where, on May 28, the Grand River was examined from Grand Rapids to its mouth. The Board reconvened at Detroit, Mich., at 10 a. m., May 29, and after agreeing upon this its report the Board then adjourned.

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CAUSES OF COMPLAINT AT GRAND RAPIDS AND REMEDIES PROPOSED LOCALLY.

The various meetings of the Board and the public hearing have developed the fact that since 1904 floods in the Grand River have produced locally much loss to property and suffering to individuals, and have caused so much anxiety that the city of Grand Rapids is now engaged in the execution of a project for flood protection for which there has been appropriated $1,000,000. It was stated that the city administration earnestly desired that the United States furnish assistance by the removal of as many as possible of the obstructions to a free discharge of flood waters, and city officials and several speakers at the hearing strongly urged that the Board discuss and express a definite opinion as to the relative merits of the various projects for flood protection submitted to it, which may be classified under the following headings, or a combination of them:

First. The creation of a reservoir or system of reservoirs above Grand Rapids by damming the Grand River and its principal tributaries;

Second. The diversion of a considerable fraction of the high-water flow into new artificial channels, discharging into the Grand River at a suitable point below the town;

Third. The use of levees or masonry walls of such height as to protect the city against the highest floods;

Fourth. Lowering the flood level by dredging and rock removal in Grand River, in order to furnish a cross section of sufficient area to flatten the high-water slope and bring it below the danger line at and in the vicinity of Grand Rapids; and

Fifth. A general raising of street grades and of buildings along the water front on both sides of the river, so as to bring streets above the elevation of extreme high water.

CAUSES OF FLOODS.

Grand River is normally a low-water stream. Floods are usually of short duration. In 1904 and 1905 the floods were, however, of exceptional height and caused great inconvenience and loss in the city of Grand Rapids. These conditions are not, however, peculiar to Grand Rapids, but are to be found wherever a large and prosperous city has grown up on the banks of a river. The banks, originally low and swampy, are in the beginning covered by floods, but as land is then of comparatively little value, these lowlands are unoccupied and no trouble arises. Gradually as such cities grow the lowland is reclaimed, more and more of the original river bed is occupied, bridges, and perhaps power dams, obstruct free flow, and finally a combination of natural conditions leads to a flood of unusual height. Then it is sought to explain the resulting disasters by reference to all but the real causes of the trouble. In addition, the destruction of the forests, the increased cultivation of arable lands, and the reclamation by drainage of lowlands in the upper part of the basin of the Grand River have contributed to the more rapid discharge of rain and melting snow into the channel, so that while the average precipitation and the total discharge of the river may not have varied greatly, in more recent years maximum flood discharges have become

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much greater than when the various increments of discharge were fed more gradually to the river.

The river bed, as it exists today, is the integrated result of its discharge, and it is palpably impossible for the river, which, in the countless years of its formation, has adapted its bed to the discharge of a flood volume having a maximum of, say, 25,000 to 30,000 second-feet, to suddenly accommodate itself to a free discharge of a much greater volume. It may therefore well be admitted that the present bed of the river below Grand Rapids is not capable of freely discharging the excessive floods which arise from the conditions explained above, and because the bed and banks in the immediate vicinity of Grand Rapids are composed of glacial drift and other stable material it is probable that extreme floods do cause an engorged condition at Grand Rapids with resulting increased high-water levels.

DISCUSSION OF PROPOSED REMEDIES.

While several of the projects submitted for ameliorating flood conditions appear to the Board worthy of careful consideration, with the exception of certain surveys within the city limits submitted by the city authorities, and a survey of the lower river made in 1889 and 1891, the data submitted to the Board are very meager and entirely inadequate to enable it to arrive at an intelligent conclusion as to the relative value of the various projects. Large reservoirs constructed in the upper river and its tributaries and properly controlled would undoubtedly tend to reduce flood heights and might be beneficial to low-water navigation, but no surveys or examinations have been made to determine the quantity of water that could be thus impounded, nor the extent and value of the riparian lands which would be required for such reservoirs. Certain maps with lines indicating channels for diverting flood discharge were submitted to the Board, but the topography of the country through which these diverting channels are proposed to be constructed has not been determined.

The use of levees or walls is feasible, but the result would be to place the low-lying parts of the town behind them in basins, and any failure of the levees would be liable to produce disasters greater than those already the subject of complaint. The enlargement of the lower river, to be effective, must lower the flood plane about 7¾ feet, bringing the elevation of extreme floods to a reading of 12 feet on the city gauge at Fulton street, or 19.4 on the United States Engineer gauge. Without far more detailed surveys than now exist it would be impossible to compute accurately the quantity of dredging needed; but general computations indicate that there would be required the excavation and removal of at least 40,000,000 cubic yards of material, much of it being blue clay, glacial drift, and heavy gravel. To produce the desired effect upon flood levels this material would either have to be wasted above the flood level in the immediate vicinity of its original position or else be towed into Lake Michigan and dumped there. A general elevation of street grades and of the buildings affected by the floods will, without question, solve the problem, but at a cost unknown to the Board.

The extent to which any of these methods of ameliorating flood conditions should be applied is dependent on their cost, which can

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only be determined by extensive surveys at considerable expense, which the Board does not consider itself authorized to make. The river and harbor act of March 2, 1907, states that the purpose of the examination confided to the Board is "the regulation of the floods in the interest of navigation." While the Board may have considerable latitude in discussing the problem before it, all expenditures under an appropriation bill are subject to strict construction, and it is therefore believed that any and all work recommended by the Board must be confined to the purposes prescribed in the act.

The methods of ameliorating flood conditions by the general elevation of the streets of Grand Rapids, by their protection by levees, or by the diversion of portions of the flood discharge into new artificial channels, however effective they may be to protect private property from overflow, will not materially affect the interests of navigation. While it may be possible to construct reservoirs in the upper river and its tributaries which either would reduce flood heights or would increase the low-water discharge of the river, the Board invites attention to the difficulty of utilizing such reservoirs for both purposes. A reservoir to be available for flood reduction should be drawn down to as low a level as practicable during medium stages, so as to increase its capacity for holding the flood discharge; if used for increasing the low-water discharge of the river, it must be kept as high as practicable during medium stages to increase the amount of water available during low water. As the damage from floods is strongly in evidence, while the benefits to be derived from improving navigation during low water are not as patent, there will be a constant temptation to keep the reservoirs at a low level during medium stages, and the Board is therefore of the opinion that little benefit will accrue to navigation by the construction of reservoirs to restrain flood heights. The enlargement of the river section below the city, as described above, would without doubt be beneficial to navigation, as it creates a greater depth than at present projected in a broad channel from Lake Michigan to the city.

The original project for the improvement of Grand River provided for a channel of 10 feet depth at low water, which by Congressional action has recently been limited to 6 feet. Such improvement of the channel will have little effect on flood heights, but as it is considered by the Board ample for the limited commerce existing on the Grand River, or reasonably prospective, a survey for a deeper waterway can not be recommended in the interests of navigation.

CONCLUSIONS.

The conclusions of the Board are that the floods that are the subject-matter of complaint and investigation originate and cause their principal damage above the head of navigation; that they arise from causes for which the Federal Government is not responsible; that the enlargement of the low-water section of the lower river in the interest of navigation has had no injurious effect on flood heights even though the material thus removed has been deposited between high and low water; that the regulation of floods is not required in the interest of navigation, and that the selection of a project for protection against damage by floods at and near Grand Rapids is a local question largely

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affected by private interests, for the determination of which the Board possesses neither the requisite information nor authority.

Respectfully submitted.

G. J. LYDECKER,
Colonel, Corps of Engineers.
C. McD. TOWNSEND,
Lieut. Col., Corps of Engineers.
CHARLES KELLER,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.

[Second indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., June 10, 1907.

Respectfully returned to the Chief of Engineers, United States Army.

The act of March 2, 1907, in the item appropriating funds for continuing the improvement of Grand River, Michigan, provided that "the Secretary of War may cause an examination of the river to be made by a board of engineer officers with a view to the regulation of the floods in the interest of navigation." The report on this examination, contained within, has been reviewed by the Board of Engineers for Rivers and Harbors.

The investigations of the special Board included a study of all available data and a personal examination of the river from Grand Rapids to Lake Michigan, in addition to which a public hearing was held at Grand Rapids, at which the views of officials of the community and others interested were obtained. The special Board finds that while Grand River is normally a low-water stream, occasional floods of damaging effect, though of brief duration, cause a congestion of waters in the vicinity of Grand Rapids, and result in great inconvenience and loss to local interests. The causes of these floods appear to be those incident to the clearing up of the country above the head of navigation, such as the denudation of forests and the elimination of other natural storage agencies, resulting in an increased rapidity of drainage, and to the reclamation and building up of lowlands and otherwise artificially reducing the natural flood capacity of the river bed. The special Board finds that the works of improvement provided by the General Government for the benefit of navigation of Grand River have not contributed to the present undesirable conditions.

While a number of ways are suggested for affording suitable protection against flood conditions at Grand Rapids, the present inquiry is confined to "the regulation of the floods in the interest of navigation." The conclusion is reached by the special Board that the regulation of floods is not required in the interests of navigation, and that the selection of a project for protection against damage by floods at and near Grand Rapids is a question affecting private or corporate interests and is a matter for local determination. The Board of

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Engineers for Rivers and Harbors concurs in these conclusions, and therefore is of the opinion that it is not advisable for the United States to undertake any improvement of Grand River with a view to "the regulation of the floods in the interest of navigation."

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 73.

MENOMINEE HARBOR, MICHIGAN.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF MENOMINEE HARBOR, MICHIGAN.

DECEMBER 5, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 4, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated June 17, 1907, together with copy of a report from Maj. W. V. Judson, Corps of Engineers, dated April 25, 1907, of a preliminary examination of Menominee Harbor, Michigan, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, June 17, 1907.

SIR: Under authority conferred by section 3 of the river and harbor act approved March 2, 1907, I have the honor to submit herewith, for transmission to the Public Printer, report of April 25, 1907, by Maj. W. V. Judson, Corps of Engineers, on preliminary examination ordered by said act of Menominee Harbor, Michigan, with a view of determining whether a breakwater is necessary.

The question involved in this case appears to be whether the United States shall create an artificial exterior harbor, under somewhat

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unfavorable physical conditions, in a locality where the improved natural harbor facilities are not yet fully utilized.

I do not understand that the interests of general commerce demand such action, and I therefore concur in the opinion of the local officer, of the division engineer, and of the Board of Engineers for Rivers and Harbors that the improvement of Menominee Harbor with a view to the construction of a breakwater is a work unworthy of being undertaken by the United States at the present time.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF MENOMINEE HARBOR, MICHIGAN.

UNITED STATES ENGINEER OFFICE,
Milwaukee, Wis., April 25, 1907.

GENERAL: As directed in letter, Office of the Chief of Engineers, March 14, 1907, I have the honor to submit the following report upon a preliminary examination made in compliance with the following item in section 3, river and harbor act of March 2, 1907: Menominee Harbor, Michigan, with a view to determining whether a breakwater is necessary.

The harbor of Menominee is situated on the western shore of Green Bay at the mouth of the Menominee River, about 50 miles northeasterly from the city of Green Bay, Wis. The Menominee River for a distance of 150 miles or more forms the boundary line between the States of Michigan and Wisconsin. The cities of Menominee, Mich., and Marinette, Wis., are situated at the mouth of the river, upon opposite sides thereof. The cities are of about equal size, the population of Marinette being 15,354, and of Menominee 12,818, in 1906.

Attention is invited to the Lake Survey chart of Menominee Harbor, which is forwarded herewith.[a]

The Chicago and Northwestern Railway, the Chicago, Milwaukee and St. Paul Railway, and the Wisconsin and Michigan Railway enter both cities. The Ann Arbor Railroad Company maintains a regular line of car-ferry steamers during the season of navigation, running to Frankfort on the east shore of Lake Michigan. There are also several lines of steamers, doing a mixed passenger and freight business, which call regularly at this port.

The principal industry of these cities has been the manufacture of lumber, lath, and shingles. While the volume of this business has greatly diminished in recent years, the price of manufactured forest products has so increased that the total value of lumber, etc., shipped from Menominee Harbor annually is not much less now than in former years. The principal mills now engaged in the manufacture of lumber are located along the Wisconsin side of the Menominee River. There is no sawmill remaining on the Michigan side of the river. A few smaller mills are located in the city of Menominee along the shore of Green Bay.

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[a] Not printed.

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Several other large and important manufacturing industries have been established in recent years at Menominee and Marinette, among which may be mentioned a beet-sugar factory, said to be the third largest in the United States; an extensive and fully equipped plant for the manufacture of sawmill and other machinery, and three paper mills.

The Menominee River, with a fall of several hundred feet within 75 miles of its mouth, will in the course of time furnish a great amount of water power, which will probably be utilized in and about Menominee.

The fishing industry is of considerable importance, the product of this industry for 1906 being valued at $324,000.

The following table [a] shows the commercial movements by way of the port for several years past. Included in the receipts are considerable quantities of general merchandise in transit by car ferry. The large figures for receipts in certain years have been due to the importation of logs. The exports are mostly forest products. There are no coal docks at Menominee Harbor such as are suitable for the transfer of coal in bulk from lake to rail.

Year.	Arrivals.	Departures.	Shipments.	Receipts.
	Number.	*Number.*	*Tons.*	*Tons.*
1896	1,468	1,460	550,049.5	487,045.0
1897	1,336	1,302	556,537.5	23,414.0
1898	798	804	612,926.0	16,337.0
1899	1,423	1,423	552,927.5	40,154.5
1900	839	839	180,050.0	96,129.0
1901	740	740	553,579.0	616,210.5
1902	737	737	398,644.0	377,142.0
1903	1,336	1,331	650,834.0	504,435.0
1904	964	962	751,819.0	629,985.0
1905	149	153	194,607.0	124,545.0
1906	843	657	75,223.0	90,415.0

The improvement of Menominee Harbor was first undertaken by the General Government in 1871. The total appropriations made by the United States to date, for the improvement of Menominee Harbor and River, amount to $406,089.03. The improvement has been carried on entirely by the General Government.

The entrance to Menominee River is protected by two parallel piers about 400 feet apart. A channel, 20 feet in depth, is maintained by the United States between the piers and in the river as far up as Ogden Street Bridge, the latter being about 1,800 feet above the inner ends of the piers.

The project adopted by river and harbor act of June 13, 1902, provided for a channel 20 feet deep, extending up the river for a distance of about 2 miles, and for a turning basin of the same depth at the upper end of the channel. This project was completed in 1903. The dredged channel is indicated in red on the accompanying chart.[b]

In 1905 the project was modified by omitting therefrom the maintenance of that portion of the Menominee River above and to the westward of Ogden Street Bridge.

On April 10, 1907, I conducted a well-advertised public hearing in Menominee, at which all interested in the proposed breakwater were

[a] Probably incomplete. All shipments are not entered or cleared at local custom-house.

[b] Not printed.

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invited to be present. The hearing was largely attended, and all interests were fully represented.

Arguments for the proposed breakwater were ably presented by Mr. George W. McCormick in the form of a letter, which is hereto appended.

Mr. McCormick set forth in considerable detail the commercial importance of the harbor, and summarized the reasons advanced by the citizens for the construction of a breakwater, the location of which they did not attempt definitely to specify. It developed in subsequent discussion, however, that it was the desire of those interested that the breakwater should protect from wave action the area lying between the shore and a line drawn southeasterly from Poplar Point to the outer end of the existing north pier.

The arguments advanced by the people of Menominee for the construction of a breakwater by the United States may be summarized as follows:

First. To protect the shore and wharves extending therefrom between the harbor entrance and Poplar Point from erosion and destruction by heavy seas during severe storms from the north and east.

Second. To secure a better and purer water supply for the inhabitants of the cities of Marinette and Menominee.

Third. To secure better harbor facilities for the commerce of the port.

Fourth. To provide a harbor of refuge for vessels navigating Green Bay.

Great damage has been done to the shore and wharves by storms, notably in October, 1905. The accompanying photographs[a] show the effect of this storm. In its present condition the shore between Poplar Point and the harbor entrance, which is in part built up of sawdust and mill refuse, is being eroded, and unless some measures are adopted for protecting it, in course of time a considerable portion thereof, including a part of the water front of the city of Menominee, will be washed away. It is probable that the construction of a breakwater as proposed would provide the necessary protection and would prevent further erosion.

But the erosion has not been caused by any works constructed by the United States, and its prevention is of local interest. Therefore the protection of the shore should be accomplished by the local authorities or by property owners directly interested through the construction of sea walls or otherwise, as has been the usual rule in such cases.

While the securing of a pure water supply is of paramount importance to the community, it is of no direct interest to general commerce.

The first two arguments advanced for the construction of a breakwater, therefore, appear to be without weight in so far as the General Government is concerned.

It does not appear that the present harbor facilities afforded by the improvements made by the General Government are fully utilized. There is a large amount of property contiguous to the improved channel, especially on the Michigan side of the river, which is at present unoccupied. In other cases amounts of dock frontage

[a] Not printed.

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greatly in excess of their commercial needs are occupied by certain industries. For instance, a beet-sugar factory occupies one-half mile of water front along the channel improved by the United States, whereas all its business in so far as water transportation is concerned could be done with a water front of 500 feet.

The wharves along the bay shore, for which protection is sought, are of very inferior construction and are now in a bad state of preservation. They are for the most part built of slabs and edgings and have been maintained largely to prevent erosion of the shore. One or two of the wharves are used on a very small scale as coal docks, but the majority of those used at all afford landing places for schooners and other small vessels engaged in transporting lumber, tan bark, etc. The aggregate business done at these wharves is small in amount and local in character.

If an outer harbor were created by the construction of a breakwater as proposed, a large amount of dredging would have to be done to make it available for the larger class of vessels. From an examination of the Lake Survey chart herewith it appears that the water is very shoal in the vicinity of the existing docks along the bay shore and that much of the bottom is rocky. The dredging of this harbor would be not only large in amount, but probably expensive in unit cost. The existing exterior wharves would be no asset toward an important harbor designed for the use of modern lake vessels.

It is my opinion that, if that portion of the Menominee River where the United States has dredged a 20-foot channel were properly utilized for purposes of commerce, ample provision would be made for present and prospective harbor purposes.

For the reasons stated it is my opinion that neither present nor prospective commerce warrants the large expenditure incident to the creation of an outer harbor by the construction of a breakwater and by dredging.

The necessity of a harbor of refuge at Menominee is not apparent. The volume of commerce on Green Bay is not large, compared with that on Lake Michigan, and consists principally of vessels engaged in a comparatively local business. The width between piers at the entrance to the present harbor is 400 feet—considerably greater than at any other harbor on the west shore of Lake Michigan—making entrance to the harbor comparatively easy even in stress of weather. Furthermore the entrance to Sturgeon Bay on the east shore of Green Bay is only about 16 miles distant and perfect shelter can be had there at all times. In my opinion, if a breakwater were built, there would be but few vessels engaged in commerce which would ever seek refuge behind it. At times a few fishing boats and doubtless many pleasure yachts might seek such shelter, but reasonable shelter for such craft can be had in the river.

It was stated at the public hearing that small craft can not safely enter the present harbor during a severe gale such as prevailed in October, 1905. Admitting that this statement is founded on fact, it is rarely necessary for small craft to remain out of port on a body of water like Green Bay until the weather becomes such as to prevent them entering a harbor. The existence of a harbor of refuge such as proposed would serve to tempt small craft, especially pleasure boats, to remain out longer than prudence would dictate, as they would depend upon running behind the breakwater for safety. Con-

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sequently the loss of life and of small craft would probably not be diminished.

In my opinion the cost of a breakwater of such dimensions as would protect a harbor of refuge would be unreasonably large when compared with resulting benefits to commerce.

For the foregoing reasons it is my opinion that Menominee Harbor, Michigan, is not worthy of further improvement by the General Government in the manner proposed, to wit, by means of a breakwater.

Very respectfully,

W. V. JUDSON,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

OFFICE DIVISION ENGINEER, NORTHWEST DIVISION,
Chicago, Ill., May 4, 1907.

Respectfully forwarded to the Chief of Engineers, United States Army.

I concur with the district engineer in the opinion that at the present time the local conditions of commerce and navigation do not justify any large expenditure by the General Government for a breakwater at this place.

W. H. BIXBY,
Lieut. Col., Corps of Engineers,
Division Engineer, Northwest Division.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., May 20, 1907.

Respectfully returned to the Chief of Engineers, United States Army.

The harbor of Menominee has been improved by the General Government at an expense somewhat exceeding $400,000. The entrance has been protected by jetties, and the channel between the jetties and in the river, for a distance of about 9,000 feet, has been dredged to a depth of 20 feet. The work contemplated in former projects has been completed, and that now being done is confined to the maintenance of the entrance and the river up to the bridge crossing Ogden street. By the act of March 3, 1905, the maintenance of that portion of the river above the bridge was discontinued.

It appears from statements within that the facilities afforded by the work done by the General Government have not been fully utilized, as there are considerable areas adjacent to the improved section not fully used for commercial purposes. In addition to the wharves and docking facilities in the river, considerable commercial development has taken place on the bay front of the city of Menominee, and this stretch being somewhat exposed is subject to destructive wave action. The principal purpose of the proposed breakwater appears to be the protection of the interests on the lake front, although it is

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stated that the harbor would also afford better facilities as a harbor of refuge if the breakwater were constructed.

As explained in the report of the district officer, the erosive effect of the storms on the lake front is a matter of local rather than of general interest, and its protection, in the opinion of the Board, would not be in the interests of general navigation nor would it promote or influence the general growth of lake commerce. While the construction of the breakwater would probably result in the outer harbor being used to some extent as a harbor of refuge for small vessels, it is believed that large vessels engaged in general trade would not seek this harbor for the purpose of shelter, and the facilities already afforded by the improvements made would appear to meet all reasonable demands as a place of refuge for small craft.

While the commerce of this locality is considerable in extent and importance, the records show that it has been decreasing in recent years, although its value due to advancing prices is stated to be as much as formerly. The expensive work of building a breakwater of sufficient extent to protect this harbor could be justified only by a large and growing commerce whose existence and development were dependent upon it, and in the opinion of the Board this condition does not obtain.

The Board has given careful consideration to the accompanying statement presented at a public hearing held by the district officer and to one communication[a] received by the Board bearing upon the necessity of the proposed improvement, as well as to the report of the district officer, and from all information now available has arrived at the conclusion, concurring with the district officer and the division engineer, that the improvement of Menominee Harbor, with a view to the construction of a breakwater, is a work unworthy of being undertaken by the United States at this time.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

STATEMENT SUBMITTED BY GEORGE W. M'CORMICK.

MENOMINEE, MICH., *April 10, 1907.*

DEAR SIR: In your communication to the mayor of Menominee, under date of March 9, 1907, you acquainted us with the fact that you would conduct a public hearing in this city for the purpose of securing such information as we were able to submit to assist you in arriving at a conclusion as to the necessity and advisability of the construction of a breakwater off Menominee Harbor.

In your letter you stated that in considering this question you should have to weigh the cost against the benefits gained, and that you desired that we should collect statistics bearing on the usefulness of the proposed work.

In taking up and presenting this subject to you to-day, we have endeavored to confine ourselves to the limits prescribed in your communication.

As to the question of the cost, the location, and manner of construction of the proposed breakwater, we would submit that these are matters which come entirely within the province of your office, and we therefore shall leave that part of the subject without comment, feeling sure that our Government has been sufficiently careful to select men of experience and exceptional ability to treat with that phase of the question. We therefore have directed our efforts along

[a] Not printed.

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the line of presenting to you facts which would go to show the usefulness and benefits to be gained by the proposed work.

When we began to consider reasons for the necessity of the establishing of a breakwater at our harbor we were rather at a loss to know where to start, not for a lack of reasons, however, but rather on account of the multiplicity of them.

In placing this matter before you we deem it necessary that we should first acquaint you, at least to a certain extent, with the commercial importance of the two cities located at the mouth of the Menominee River, because upon this depends largely the volume of marine traffic at this port, and we wish to state at this point that we have at the present time 30,000 people within the limits of the cities of Menominee and Marinette, and at least an equal number in the territory tributary to these cities, who are directly interested in our commerce.

In April, 1899, when the proposed work of deepening the channel of the Menominee River was being considered, Capt. J. G. Warren, of the Corps of United States Engineers, in his report stated, with reference to our cities, among other things, that—

"The manufacturing of pine lumber is the leading industry. It is claimed, probably with truth, that their mills cut more lumber than any other place in the world, and their principal exports are lumber, lath, shingles, potatoes, and fish, and the principal imports are coal, flour, hay, grain, and general merchandise."

And after considering the conditions of our channel in the river his conclusion was that "The commercial importance of this harbor would warrant the proposed improvement," and our commercial importance then was considered to be such that it warranted the improvement, and it was carried out, even in the face of the fact that such an improvement of the river inside the shore line would establish a precedent under which all other harbors in this country similarly located could consistently ask that the deepening and widening of the channels should be undertaken by the United States.

This improvement we wish to call your attention to was warranted and undertaken in 1900, when the population of these two cities did not exceed 22,000 people. Since that time a change has taken place in the lumber industry, and while we will admit that a smaller quantity of lumber is manufactured here, we also submit that the increase in value of lumber and forest products has been such that to-day the money value of the lumber and forest products dealt in at this port is equal, if not greater, at the present time than it ever has been before, and upon the authority of the lumber manufacturers and dealers in this city we make the statement that practically $4,000,000 worth of such products alone was shipped by vessel from Menominee Harbor in 1906.

Within the last seven years we have been rapidly establishing new and diversified manufacturing industries here, and since 1900 there have been established and put in operation 14 new manufacturing industries in these cities, representing an investment of $2,500,000, and each succeeding year sees a greater number of new industries started in our cities, and, of necessity, sees a corresponding increase in our commerce. As an evidence of this we beg to submit that in the year 1906 there was collected by the transportation companies in these two cities $1,240.000 for the transportation of man and merchandise, as against $896,000 in 1900, and this did not include the outgoing shipments where the freight charges would be collected from the consignee.

As a further evidence of the increase in our commerce we submit that the post-office receipts of these two cities in 1900 were $32,815, and in 1906 they amounted to $50,535, a gain of 54 per cent in the seven years mentioned.

We have entering this city divisions of the Chicago and North-Western, the Chicago, Milwaukee and St. Paul, and the Wisconsin and Michigan railroads, and we have this port as a terminus of the Ann Arbor Railroad Car Ferry Line. Menominee and Marinette are also ports of call for the Goodrich Transit Company, the Hart Steamship Line, the Green Bay Steamship Line, the Hill Steamship Line, and the Maloney and Roulette Steamship Line, and we will also have this season what is known as a Buffalo Line calling at our port, besides the Lake Michigan Car Ferry Transportation Company's ferry line of boats which ply between Peshtigo and Chicago, and with the exception of the Lake Michigan Car Ferry Transportation Company's line all of these transportation companies carry both passengers and merchandise.

We would point out in connection with our other industries that we have established here at the present time the third largest beet-sugar factory in the United States, which brings in its supply of 15,000 tons of coal a year entirely by vessel. It also brings in from ports on Green Bay about 10,000 tons of

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sugar beets annually on scows and small boats. We also have three large (pulp) paper mills, consuming 25,000 cords of pulp wood annually We would call your further attention to the fact that there are located on the bay shore three coal docks and three others within the harbor that bring in their entire supply of hard and soft coal by vessel. Besides we have established here the largest wholesale grocery and fresh-fruit company in the State of Michigan, bringing in and shipping our great quantities of merchandise, fruit, and farm produce.

Tributary to this port we have the most important fishing industry on the Great Lakes, in which are engaged, both north and south of the harbor, a large number of persons and fully fifty small craft, power and sail, in transporting their catch of fish and their supplies, all of which is sold and purchased in these cities. The value of the fish brought into this port from our fisheries in 1906 amounted to $324,000, and these were all carried on the waters of Green Bay, and the necessary supplies pertaining thereto carried back from our port.

In considering the commercial importance of our cities at the mouth of the Menominee River, it would be an injustice to our cause if we failed to mention, at least briefly, our future prospects, because in all undertakings we plan not only for the present, but for the future, and therefore the future commerce of these cities has a direct bearing on the project under consideration.

There is tributary to these two cities an agricultural district large in extent and fertile in its soil, and but in its infancy as yet in development; however, it is growing very rapidly, as thousands of farms are now opened up in the adjoining counties where fifteen years ago virgin forests stood, and every year their varied products are swelling to greater and greater proportions, and they naturally seek their market in these, the largest commercial centers within their reach, and it certainly can be but a few years when large grain elevators and other warehouses must be established here to handle these farm products.

With the Menominee River there exists one of the most potent factors for the future development of our cities. This river has within the first 88 miles from its mouth a fall of 648 feet, from which, on a conservative estimate, 100,000 horsepower can be developed. Five water powers on this stream are already developed, and one within 30 miles of our harbor is now being developed, and the power is to be conveyed by electricity to these cities, and this power is practically all contracted for and will be utilized in Menominee and Marinette. So with the growing industries we already have and with the magnificent agricultural country surrounding us, and with this great store of energy afforded us by the Menominee River, and with our exceptional transportation facilities by rail and by water, and with our untouched hard-wood forests, we have here cities which from their natural advantages are attracting the attention of capitalists and manufacturers from many States and a development will take place which will within the next ten years double our commerce.

We feel it essential that we should call your attention to the amount of money that is invested in dock properties and private properties along the shore of our bay between the mouth of our river and Poplar Point. We have to-day on this shore 14 docks with a value at the present cost of material of at least $750,000, and we have residence and other private property along this same shore with a value equally as great, making a total of at least $1,500,000, exclusive of the manufacturing institutions connected with these docks, and whose business depends largely upon the maintenance of them for receiving and shipping out their merchandise.

Next we wish to refer especially to our marine commerce and to the importance of this harbor; and by referring to the custom-house reports of 1906 we find that these records show that the total entries at this harbor, including steamers and sail vessels, amounted to 666, with a tonnage of 273,276, and the clearings of craft from this harbor amounted to 647, with a tonnage of 271,217, making a total of entry and clearing of 1,313 vessels with a total tonnage of 544,983. Exclusive of this the nonresident and resident fishing craft, both power and sail, that trade in this harbor made in the season of 1906 over 2,000 trips, bringing in their fish and carrying back their supplies. While these vessels and smaller craft carried a variety of merchandise of which we can not get a fair estimate, there are certain articles of which we have the correct values—for instance, lumber and forest products to the value of $3,960,000 were shipped from these cities in 1906. Coal to the value of $240,000 was received at our docks last year. Fish to the value of $324,000 was received, and a considerable portion of it shipped out again by water from our cities the past year. Sugar beets to the value of $48,000 were brought to our sugar factory by boat last

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season. There passed through our harbor to our lumber mills over 700 rafts of logs last year, with an approximate value of $560,000, a very considerable portion of which is brought from points along the shores of Green Bay where no railroads are established, and many rafts of logs had to be towed to our lumber mills on our bay shore. There were received in 1906 at docks along the shore 65 cargoes of stone and brick, which are carried, as you are well aware, on open scows. While we are enabled to get at the approximate quantity and value of the products mentioned that enter into our marine commerce, it would be very difficult to get at the quantity and value of the other merchandise entering and leaving our port by vessel, but it is safe to say that it would add at least $2,000,000 more to the amount already stated. We would also call your attention to the fact that 22,000 passengers a year, exclusive of through passengers, come and go by boat from our cities.

We have only attempted to compile the value of merchandise and have not taken into consideration the value of the various boats of different kinds that enter and leave our harbor, but it would not be a difficult matter to ascertain, approximately, what this would amount to, and all taken together would amount to a sum much greater than any casual observer could conceive, although he be frequently in a position to witness the coming and going of the boats.

We have mentioned so far, in a measure only, our own commercial importance and our marine commerce, but there is a very large marine commerce on the waters of Green Bay that must be taken into consideration by our Government and by you, Major Judson, as their representative, in considering the project. As you are aware, there are located along the Fox River a large number of the most important paper mills in the United States that depend wholly, or in a considerable part, together with our own paper mills located here, upon pulp wood from which to make their product, and upon inquiry we learned that at least 60 per cent of this supply of pulp wood which these mills consume is towed in rafts from the north shore of Lake Michigan from Georgian Bay and the Soo through these waters to a point near Green Bay, where the rafts are broken up and the wood loaded on cars and shipped through to the mills above mentioned. The volume of this product, which runs into hundreds of thousands of cords annually, has a very large value, and, as every marine man is aware, a tow of this character is particularly difficult to handle even in fair weather, but in cases of violent storms it is much more precarious, as the movement is slow and as the danger of their breaking to pieces or breaking away from the tug is great, and a place of shelter or refuge in event of such storms becomes absolutely necessary to the safety of both the tug and the rafts. Besides the towing of pulp wood to those mills to the south of us, we are obliged to state that our own paper mills located here will be under the necessity within a very few years of securing virtually all of their supply of pulp wood from the same source.

Aside from this we have a large vessel trade constantly passing to and fro on the waters of Green Bay, carrying coal, ore, grain, lumber, and other merchandise, which we can not calculate on account of our lack of knowledge of the exact volume. Of importance also is the fact that there are located at ports on Green Bay several dredge companies with their expensive equipment of dredges, scows, and pile drivers, which are frequently being moved from Green Bay, Sturgeon Bay, or Menominee to other ports for the purpose of carrying on their business, and the Government also frequently has dredges which must be moved over these same waters, and it is unnecessary for us to point out the dangers attending the moving of such, especially in event of storms. We would mention further that there are a considerable number of small craft, both sail and power, used solely for pleasure and carrying only human freight.

With all these various boats, pleasure craft, dredges, tugs, and rafts plying our waters we have no place which could be considered in any sense as a port of refuge on the west coast of Green Bay, between Escanaba on the north and Green Bay, Wis., on the south; in fact neither of those places could be truly considered as a port of refuge, and so far as the east coast of Green Bay is concerned only very meager provisions have been made with this point in view. Therefore we have every year boats making trips numbering in the thousands carrying human lives and carrying merchandise, the value of which amounts into the millions, at the mercy of the violent and sudden storms which take place on these waters; and it is a well-known fact that storms cause distressing seas more quickly on this bay than they do on the larger

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bodies of water, and therefore there is a greater necessity for a place of refuge centrally located, which may be quickly reached, than exists on the lakes and larger bodies of water. Again, so much of the traffic carried on over the waters of Green Bay is of a much more hazardous nature, on account of the small boats and scows engaged and of the towing of rafts, that our necessity for a place of shelter of easy access is emphasized.

That we have violent storms on this body of water is easy to demonstrate, as the havoc and destruction wrought by such storms will testify in no uncertain manner. For instance, if we can take as an example one storm which occurred about the middle of October, 1905, we find that on the shore immediately adjacent to our harbor, and we may state within the limits of the cities of Menominee and Marinette, this storm in its violence destroyed dock property to the value of $230,000, stock on docks to the value of $50,000, and destroyed or damaged boat and dredge property to the value of $15,000, without making mention of the ravages of private property along this same shore. The Ann Arbor Railroad alone lost over half a mile of its tracks and sustained a damage entailing a loss amounting to $15,000 on account of this storm, and by reason of same was unable to make this port for a period of over thirty days. The passing of no freight either way on that line, upon which many of our manufacturing institutions were depending for coal and other supplies, crippled and seriously interfered with a number of our industrial institutions on account of the delay and lack of material. Not only did the storm work its ravages on the shore line, but also inside the mouth of our harbor, where a heavy undertow sets in every time we have high seas rolling on the bay.

Under these conditions and with the lack of shelter our marine commerce is carried on each year with serious inconvenience and loss. Dock owners along our bay shore find that it is becoming too expensive, on account of the added cost of materials to maintain efficient docks. Vessels that must load and discharge their cargoes at these shore docks encounter the dangers of every storm and must leave their loading or unloading and run up the river for shelter at a loss, even if they are self-propelling, and at the cost of hiring a tug if they are not. It is becoming difficult for these institutions located on the shore to obtain charters, as marine men well know the attending dangers of landing at their docks, and these same institutions find that they must therefore curtail their vessel shipments and resort to rail shipments at a greater cost; and this knowledge of the danger of locating docks on our shore has turned away from our cities railroad companies intending to come here and establish ore docks and capitalists intending to establish coal docks. We have it on good authority that the Chicago, Milwaukee and St. Paul Railroad Company, knowing the danger of establishing and the cost of maintaining coal and ore docks on our shore, sought a safer port for same, although they have a line of railroad running into our city, and were obliged, even at an additional expense of paying for the right to run over another line of railroad, and that for a considerable distance with an up-grade haul.

The prevailing violent storms that we have on this bay are from the northeast, and it is well known, and can be testified to by mariners that make our port, that in such storms many of the smaller craft that make this port find it dangerous and difficult to enter, and even when boats have entered our harbor they can not find safe mooring below the bridge on account of the heavy undertow they encounter, which would readily part their lines if they tied to those docks, and they therefore must find shelter above the bridge and pay the added cost for towing their boats above for better mooring.

That our Government recognizes the necessity to her marine interests by establishing harbors of refuge under such circumstances, we have but to point to Harbor Beach, on Lake Huron, where a port of refuge has been established at an immense outlay, as there was no safe shelter between Port Huron and Tawas Bay, and to prove that our Government recognizes the dangers of this coast, they have established a light-ship off Peshtigo Harbor and maintain the same.

Again, the question of a pure water supply for our 30,000 people is an important one, and we have the assurance of the water companies of our two cities that should the Government establish a breakwater off Menominee Harbor they would carry their intake pipes beyond, which would fully assure us of having pure water, free from the city sewage that now empties into the bay and river and that might be carried and no doubt is carried into the mouths of the present intake pipes by currents and storms.

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Again, an important matter which we wish to direct your attention to is the fact that only a very short portion of our river is navigable and therefore affords a limited and comparatively small amount of dockage, which is largely occupied at the present time, and with the rapid development of our cities which is now taking place, and with new industries seeking to locate where they may have water transportation which would afford them more favorable freight rates, it will be but a short time until such industries will be forced to locate upon the shore of our bay to enjoy this advantage, for lack of room in our river.

Summing up the arguments, therefore, of the usefulness and of the benefits gained by the establishing of a breakwater off our harbor, we wish to recount our reasons for asking the carrying out of this project.

In the first place, we urge it because of the commercial importance of these two cities.

By reason of this being the natural gateway to a large tributary country.

By reason of our considerable marine commerce which we have at present and also that which we may logically expect will develop in the near future.

By reason of its securing us a better and purer water supply for the 30,000 inhabitants of these cities.

By reason of the protection it would afford to the fleets engaged in our extensive fishing industry.

By reason of the protection it would afford to our docks and industries located thereat and other private property located at the mouth of our harbor and along the shore between there and Poplar Point.

By reason of the necessity of a centrally located harbor of refuge on the waters of Green Bay, on the west shore, not only for our own marine commerce, but for passing vessels, tows, dredges, and pleasure craft which frequent these waters.

For these reasons and for the future development of our cities, in which our Government is always interested, we therefore deem it of first importance that a breakwater be constructed off Menominee Harbor, and tender you this memorial for your careful consideration and trust that your report may favor its establishment.

Tonnage of this port fully three times the amount shown by custom-house records, accounted for as follows:

Many large boats from lower lakes carry coal to Green Bay and when leaving there clear direct for Buffalo and Cleveland and load lumber at this port and no record made of such entry or clearance at the local custom office.

None of the passenger boats touching at this port report here, except a few small steamers running direct from their home station to this port and returning directly to their home port.

Every day of the shipping season two boat lines alone contribute 800 tons to this port, for which no credit is given.

Green Bay Transportation Company and Goodrich Line do not report or clear here; all that is lost in our statement of tonnage.

(Unsigned, but submitted by Mr. George W. McCormick.)

Maj. W. V. JUDSON,
Corps of Engineers, U. S. A.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 74.

COSCOB HARBOR, CONNECTICUT.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF COSCOB HARBOR, CONNECTICUT.

DECEMBER 5, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 4, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated April 22, 1907, together with copy of a report from Maj. Harry Taylor, Corps of Engineers, dated March 22, 1907, of a preliminary examination of Coscob Harbor, Connecticut, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, April 22, 1907.

SIR: Under authority conferred by section 3 of the river and harbor act approved March 2, 1907, I have the honor to submit herewith for transmission to the Public Printer report of March 22, 1907, by Maj. Harry Taylor, Corps of Engineers, on preliminary examination authorized by said act of March 2, 1907, of Coscob Harbor, Connecticut, with a view to obtaining a sufficient depth to the drawbridge.

From this report it appears that between 1892 and 1899, inclusive, this locality was under improvement by the United States and that a channel with depth of 6 feet was dredged up to the bridge; also that there probably now exists a depth of about 6 feet in the dredged channel. The improvement desired at this time is a depth of not less than 10 feet.

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For the reasons given, I concur in the opinion of the district officer, of the division engineer, and of the Board of Engineers for Rivers and Harbors that this locality is not worthy of further improvement by the General Government.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF COSCOB HARBOR, CONNECTICUT.

ENGINEER OFFICE, UNITED STATES ARMY,
New London, Conn., March 22, 1907.

GENERAL: In compliance with instructions from your office and requirements of the act of Congress approved March 2, 1907, I have the honor to submit the following report of a preliminary examination of Coscob Harbor, Connecticut, with a view to obtaining a sufficient depth to the drawbridge.

Coscob Harbor is situated on the north shore of Long Island Sound, near the boundary line between the States of New York and Connecticut, at a distance by rail from the Grand Central Station in New York City of 30 miles.

A project for Coscob Harbor was adopted in 1892, which provided for a channel 6 feet deep and 150 feet wide up to the railroad bridge, and 100 feet wide thence about 4,300 feet to Mianus; estimated cost, $36,000. This project was extended in 1896 to include a turning basin in the lower harbor 7 feet deep, 300 feet wide, and 2,000 feet long, and the estimated cost was increased to $54,000. The last work done on this project was in 1899, at which time the basin had been about half completed and the channel had been made full-project dimensions up to Coscob and to a point about 1,600 feet above the railroad bridge.

So far as known, no serious impairment of the channel dimensions has taken place, and there is probably now existing a depth of about 6 feet in the dredged channel below the bridge, although the last surveys made show a somewhat greater depth.

The expenditures on this project amount to about $19,000.

This improvement was one of several in regard to which the provisions of previous river and harbor acts were repealed by the act approved March 3, 1905.

The New York, New Haven and Hartford Railroad Company has recently established at Coscob its main power station for furnishing electrical power to operate its trains over the division between New York City and Stamford, Conn., and desires in the future to bring in by water the coal necessary for the operation of this plant. It is estimated that the amount of coal to be brought in annually in the immediate future will be 35,000 tons and that this amount will be eventually increased to approximately 100,000 tons. For the purpose of this traffic the railroad company states that a channel not less than 10 feet in depth at low water and 100 feet in width will be required.

So far as known, outside of the improvements made by the New York, New Haven and Hartford Railroad Company, conditions at Coscob Harbor remain exactly the same as they have been in past years, and any further improvement of Coscob Harbor will be for the

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sole benefit of the New York, New Haven and Hartford Railroad Company. This improvement will be, not for commerce which is brought in for distribution over the railroad, but for increased facilities for bringing in its fuel for burning in its power house.

To dredge a channel of the dimensions stated by the New York, New Haven and Hartford Railroad Company to be necessary for its accommodation would require the dredging of approximately 116,000 cubic yards, of which 67,000 cubic yards is inside of Goose Island at the entrance to the harbor proper and 49,000 cubic yards outside thereof. Inside of Goose Island the material, so far as known, is mud, and there would be no particular difficulty attending the work, but outside of Goose Island, for half a mile or more, the existing channel is between small rocky islands and reefs, and there is considerable doubt as to the nature of the material which would be encountered, it being quite probable that ledge rock would be encountered in places before a depth of 10 feet was reached. After the improvement is once completed, considerable annual dredging will be required for the maintenance of the outer portion.

In my opinion, the locality is not worthy of further improvement by the United States.

Should a survey of this locality be desired, it is estimated that it will cost $400, and an allotment of this amount is requested.

Very respectfully, your obedient servant,

HARRY TAYLOR,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

NORTHEAST DIVISION ENGINEER OFFICE,
New York, March 23, 1907.

Respectfully forwarded to the Chief of Engineers, United States Army, concurring in the views of the district officer.

AMOS STICKNEY,
Colonel, Corps of Engineers,
Division Engineer.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., April 15, 1907.

Respectfully returned to the Chief of Engineers, United States Army.

Among the preliminary examinations ordered by the act of March 2, 1907, is one of "Coscob Harbor, with a view to obtaining a sufficient depth to drawbridge," the report on which is contained within.

This harbor is situated on the north shore of Long Island Sound near the boundary line between the States of New York and Connecticut. It has been under improvement by the United States since 1892, when a project was adopted for constructing a low-water channel from the mouth of the river up to the railroad bridge, 150 feet wide and 6 feet deep, and 100 feet wide and of the same depth from the bridge to the village of Mianus, at a cost of $36,000. The river and harbor act of 1894 required a "survey of the lower part of the harbor with a view of making a turning basin therein," and the report

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thereon presented a project for this work at a cost of $18,000, making the total cost of proposed work at this locality $54,000. The modified project was adopted by the river and harbor act of 1896. In 1899, when work at this harbor ceased, the basin had been about half completed and the channel had been excavated to full-project dimensions up to Coscob and to a point about 1,600 feet above the railroad bridge. The total expenditures at this locality have amounted to about $19,000.

The river and harbor act approved March 3, 1905, contained the following provision:

SEC. 7. That the provisions of river and harbor Acts heretofore passed providing for the prosecution of work upon the following projects are hereby repealed, and any amounts heretofore appropriated for any of the same now remaining unexpended shall be paid into the Treasury of the United States, to wit:

* * * * * * *

Coscob Harbor and Mianus River, Connecticut.

From the within report it appears that the improvement now desired is a channel not less than 10 feet in depth at low water and 100 feet in width up to the drawbridge of the New York, New Haven and Hartford Railroad Company. The object of the improvement is to provide a water route by which coal may be brought in by this railroad company for use at its main power station, now being established at this point for furnishing electrical power to operate its trains over the division between New York City and Stamford, Conn. The estimated annual amount of coal to be brought in in the immediate future is 35,000 tons, and this may be increased eventually to approximately 100,000 tons per annum.

For the five years from 1899 to 1903, inclusive, the commerce of Coscob Harbor, as reported in the Annual Reports of the Chief of Engineers, averaged less than 8,500 tons per annum and consisted mainly of coal and oysters. In the Annual Report for 1904, which is the last giving information on this harbor, it is stated that "no impairment of this channel or of the part of the basin dredged has been reported," from which it is evident that, although there existed a channel of full-project dimensions up to Coscob during the five years above mentioned, no development of commerce resulted, but, on the contrary, the commerce steadily decreased. The district officer now states that the physical and commercial conditions have undergone no great change in recent years and that the further improvement of this harbor would be solely for the benefit of one corporation. This company was invited by the district officer to submit to the Board statements or arguments in regard to the needs of commerce at this locality, but no communication has been received from them.

In view of the above, the Board is of the opinion that the benefits to general commerce from additional improvement at Coscob Harbor would not be commensurate with the expenditure required. It concurs with the district officer and the division engineer that the locality is not worthy of further improvement by the General Government, and recommends that no survey be made.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 75.

NIAGARA RIVER, NEW YORK

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION, WITH PLAN AND ESTIMATE OF COST OF IMPROVEMENT, OF NIAGARA RIVER FROM TONAWANDA TO GILL CREEK, NEW YORK.

DECEMBER 5, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 4, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated June 28, 1907, together with copies of reports from Col. H. M. Adams, Corps of Engineers, dated May 17 and June 15, 1907, of a preliminary examination of Niagara River from Tonawanda to Gill Greek, New York, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, June 28, 1907.

SIR: Under authority conferred by section 3 of the river and harbor act approved March 2, 1907, I have the honor to submit herewith for transmission to the Public Printer reports of May 17 and June 15, 1907, by Col. H. M. Adams, Corps of Engineers, on preliminary

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examination, with plan and estimate of cost of improvement, ordered by said act, of Niagara River from Tonawanda to Gill Creek, New York.

Some work at this locality was done by the General Government between 1894 and 1899 under a project which aimed to secure a channel 200 feet wide and 12 feet deep from Tonawanda to Schlosser's dock, about 2,000 feet above Gill Creek.

This project was not finished and the work now proposed is that necessary for its completion, which consists in securing a channel of the dimensions named at Cayuga Island shoal. The estimated cost of this work is $10,000.

I concur in the opinion of the district officer and of the Board of Engineers for Rivers and Harbors that the locality is worthy of improvement to this extent.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF NIAGARA RIVER FROM TONAWANDA TO GILL CREEK, NEW YORK.

UNITED STATES ENGINEER OFFICE,
Buffalo, N. Y., May 17, 1907.

GENERAL: I have the honor to submit report of a preliminary examination of Niagara River from Tonawanda to Gill Creek, provided for in the river and harbor act of March 2, 1907, and assigned to my charge by letter of March 14, 1907.

From the foot of Tonawanda Island to Gill Creek is approximately 7¾ miles, the bottom being composed of hardpan and rock ledges. A navigable channel of 12 feet depth and 200 feet wide, except across Cayuga Island shoal, where the width is from 150 to 170 feet, is now available from Tonawanda to Schlosser's dock, about 2,000 feet above Gill Creek.

Gill Creek is a small stream, less than 50 feet wide just above its mouth, and with depth of from 2 to 5 feet. There are no manufacturing interests at its mouth, most of these being lower down, near the Great Falls.

From Schlosser's dock, which lies behind Conners Island, and is the port of Niagara Falls, to Gill Creek the water is from 4 to 5 feet deep.

The principal commerce of the port is the receipt of pulp wood for the paper mills of Niagara Falls. This pulp wood comes partly from American ports and partly from Canadian ports on the Great Lakes. It is brought down the Canadian channel on lake vessels to a point opposite Navy Island, where it is made into sack rafts and towed across the main channel to Schlosser's dock. Here the rafts are opened, and the sticks floated through a runway down the river past Gill Creek into a boom, from which they are conveyed to the paper mills by an endless-chain carrier.

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The amount of pulp wood thus received during the calendar year 1906, as reported by the collector of customs at Niagara Falls, was 20,828 tons, being the only receipts, and no shipments were made by water. For the same period the total arrivals and departures were 90, and the tonnage 53,957. Value of imports, $41,653.

The first report of an examination of the Niagara River above Niagara Falls, with a view to improvement by the United States, was made by Maj. Walter McFarland, Corps of Engineers, January 15, 1881. This is printed on page 2454 of the Annual Report of the Chief of Engineers for 1881 under the heading "Examination of the harbor at Port Day, above the Falls of Niagara, New York."

In this report an estimate of $17,000 was made for cutting a channel 600 feet long, 75 feet wide, and 6 feet deep through a rock ledge "forming the basis of Schlossers Rapids," for the purpose of allowing canal boats drawing not more than 5 feet to pass from the Canadian channel across to Port Day, at the head of the hydraulic canal at Niagara Falls. This project was not adopted; no appropriation was made.

The next report on examination and survey was made by Maj. Amos Stickney, Corps of Engineers, December 31, 1891. This is printed on pages 2541 et seq. of the Annual Report of the Chief of Engineers for 1892, under the heading "Survey of Port Day, above Niagara Falls, New York."

This survey covered not only the immediate vicinity of Port Day, but several shoal spots in the Niagara River between Port Day and Tonawanda by the American channel, and estimates for channels of different depths between these two points were as follows:

For 18 feet depth	$8,694,824.60
For 12 feet depth	1,341,029.80
For 9 feet depth	380,377.80
For 8 feet depth	257,829.00

A project calling for 8 feet depth was adopted, the first appropriation of $20,000 being made by the river and harbor act of July 13, 1892.

No expenditure was made under this appropriation, and the project was modified by the river and harbor act of August 18, 1894, so as to provide for a channel 200 feet wide and 12 feet deep from Tonawanda to Schlosser's dock, at an estimated cost of $230,000, afterwards reduced to $180,000, and subsequently to $95,000.

Under this modified project $60,000 was appropriated and expended between 1894 and 1899, when work was suspended, the channel through the shoal at the head of Conners Island having been completed and the channel through the shoal above Cayuga Island excavated 12 feet deep and from 150 to 170 feet wide, leaving from 30 to 50 feet in width to be excavated to complete the channel of the modified project.

The last appropriation was made March 3, 1899, and an estimate was made by the officer in charge of the district in annual reports for 1899, 1900, 1901, and 1902. No appropriation having been made, this work was dropped from the list of works in the Buffalo district in report for 1904.

It is believed that Niagara River from Tonawanda to Gill Creek is worthy of improvement by the United States to the extent of com-

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pleting the channel across the Cayuga Island shoal, 1,000 feet long, to the full width of 200 feet and depth of 12 feet at mean river level, as contemplated by the modified project of August 18, 1894.

The channel is oblique to the direction of the current at this point and should have the full project width of 200 feet in order to make navigation from Tonawanda to Schlosser's dock, the port of Niagara Falls, safe for vessels that require not more than 12 feet of water.

A plan and estimate of cost can be made in this office without allotment of funds.

Very respectfully, your obedient servant,

H. M. ADAMS,
Colonel, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.

[Second indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., May 27, 1907.

Respectfully returned to the Chief of Engineers, United States Army.

The work done by the General Government on the improvement of the Niagara River between Tonawanda and Niagara Falls was under a project adopted in 1894, which provided for a channel 200 feet wide and 12 feet deep from Tonawanda to Schlosser's dock, which is located about 2,000 feet above Gill Creek and is the port of the city of Niagara. The improvement required a cut through two shoals, one a short distance above Conners Island quite near Schlosser's dock, and the other about half way between Cayuga Island and Tonawanda. Sixty thousand dollars was appropriated and expended and the Conners Island cut completed, but the Cayuga Island cut was not excavated to full width.

The district officer now states that in his opinion the stretch of river under consideration is worthy of improvement to the extent of completing the work contemplated under the project of 1894, and that an estimate of cost can be made without allotment of funds.

A reference to former reports on the improvement of this stretch of river indicates a commerce of 30,000 to 50,000 tons of pulp wood and a passenger excursion business. It is stated within that the present commerce is about 20,828 tons of pulp wood, valued at $41,653, and that this commerce is brought down the Canadian channel to a point near Navy Island where the logs are made into rafts and towed over to Schlosser's dock, presumably via the channel cut through the shoal just above Conners Island and which is reported to have been given the full projected dimensions. It would appear, therefore, that the completion of the cut through Cayuga Island shoal to projected dimensions would have no influence upon this pulp-wood commerce. In former reports, however, reference is made to a small tonnage other than in pulp wood and to a passenger business, and it may be that these are now of some importance and worthy of consideration.

With a view to having before it all available data before expressing an opinion as to the advisability of the United States extending the improvement, the Board recommends that the estimate of cost which

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can be made without expense be authorized and that the district officer be requested to submit with his report further remarks upon the character and extent of the commerce that will be expected to use the channel through Cayuga Island Cut.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

[Third indorsement.]

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, May 29, 1907.

Respectfully submitted to the Secretary of War.

This is a report on preliminary examination of Niagara River from Tonawanda to Gill Creek, New York, authorized by the river and harbor act of March 2, 1907.

Inviting attention to the report of the Board of Engineers for Rivers and Harbors in the preceding indorsement, I recommend that preparation of plan and estimate of cost of improvement of the locality, as proposed, be authorized.

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

[Fourth indorsement.]

WAR DEPARTMENT,
May 31, 1907.

Approved as recommended by the Chief of Engineers in the preceding indorsement.

ROBERT SHAW OLIVER,
Acting Secretary of War.

PLAN AND ESTIMATE OF COST OF IMPROVING NIAGARA RIVER FROM TONAWANDA TO GILL CREEK, NEW YORK.

UNITED STATES ENGINEER OFFICE,
Buffalo, N. Y., June 15, 1907.

GENERAL: I have the honor to submit the following report on a plan and estimate of cost of improving Niagara River from Tonawanda to Gill Creek, New York, to the extent of completing the channel across the Cayuga Island shoal, 1,000 feet long, to the full width of 200 feet and depth of 12 feet at mean river level, in accordance with instructions contained in letter of June 3, 1907.

The completion of this channel will require:

Excavation of blasted rock, 4,500 cubic yards, place measure, at $2 per cubic yard	$9,000
Contingencies and engineering	1,000
Total	10,000

The passenger business using this channel consists of excursions from Buffalo on steamers of 6 to 8 feet draft, usually accompanied

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by a picnic barge of 2 to 4 feet draft towed alongside. During the season of about four months, June to September, from one to five of these vessels daily carry parties down the American channel, around the foot of Grand Island, and return to Buffalo by the Canadian channel; occasionally a party is landed at Schlosser's dock. This passenger business will probably continue and may increase with the increase of population along the Niagara frontier.

The freight business using the channel consists of raw materials carried on canal boats of 6 to 8 feet draft, towed by tugs from the Erie Canal at Tonawanda to Schlosser's dock. The extent of this business for the past twelve years is shown in the following table, compiled from Annual Reports of the Chief of Engineers and reports received from the collector of customs, Niagara Falls, N. Y.:

Freight received at Schlosser's dock via Niagara River channel from Tonawanda.

Year.	Pulp wood.	Rosin, potash, clay, sulphur, nitrates, rock, etc.	Year.	Pulp wood.	Rosin, potash, clay, sulphur, nitrates, rock, etc.
	Tons.	*Tons.*		*Tons.*	*Tons.*
1895	300	100	1901		1,579
1896			1902		135
1897			1903		3,095
1898			1904		
1899		1,410	1905		
1900		1,517	1906		

It is probable that the constantly increasing manufacturing interests at Niagara Falls and the construction of the New York State barge canal will in time develop a greater traffic by river. The existing 12-foot channel, completed as herein proposed, would be of the same depth as the barge canal and meet all requirements for canal-barge navigation.

Very respectfully, your obedient servant,

H. M. ADAMS,
Colonel, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.

[Second indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., June 24, 1907.

Respectfully returned to the Chief of Engineers, United States Army.

In the within report the district officer estimates that the channel across Cayuga Island shoal can be completed to the full width of 200 feet and depth of 12 feet at mean river level, as contemplated by the modified project of August 18, 1894, at a total cost of $10,000.

The statistics furnished by the district officer indicate that only a small amount of commerce has hitherto been carried on the American channel between Tonawanda and Niagara Falls. The locality is one [illegible]pidly being developed, owing to the establishment of [illegible]s, which are attracted by the cheap electrical power [illegible]the Falls. With the completion of the enlarged Erie

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Canal it is probable that further impetus will be given to industrial activity along the shore of Niagara River, and it seems desirable that the American channel betwen the terminus of the Erie Canal and Niagara Falls should be available for such traffic as now exists or which may be created in the future.

As the cost of completing this improvement is small and the character of the river bed is such that no expense for maintenance need be considered, the Board is of the opinion that it is advisable for the United States to undertake the work in accordance with the plan presented by the district officer.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 76.

LOWER THOROUGHFARE, AT WENONA, DEAL ISLAND, MARYLAND.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION, WITH PLAN AND ESTIMATE OF COST OF IMPROVEMENT, OF LOWER THOROUGHFARE, AT WENONA, DEAL ISLAND, MARYLAND.

DECEMBER 5, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 4, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated June 8, 1907, together with copies of reports from Lieut. Col. R. L. Hoxie, Corps of Engineers, dated April 18 and May 21, 1907, of a preliminary examination of Lower Thoroughfare, at Wenona, Deal Island, Maryland, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, June 8, 1907.

SIR: Under authority conferred by section 3 of the river and harbor act approved March 2, 1907, I have the honor to submit herewith, for transmission to the Public Printer, reports of April 18 and May 21, 1907, by Lieut. Col. R. L. Hoxie, Corps of Engineers, on preliminary examination, with plan and estimate of cost of improvement, of Lower Thoroughfare, at or near Wenona, Deal Island, Maryland,

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with a view to deepening the channel and constructing a basin, as provided for in said act of March 2, 1907.

In 1882 a channel 80 feet wide and 6 feet deep at mean low water was dredged at this locality, with a turning basin at the inner end, and the work now proposed is to restore the channel and increase the area of the turning basin to permit of its being used for anchorage purposes as well. The estimated cost of this work is (in round numbers) $5,300, with $200 annually for maintenance after completion.

I concur in the opinion of the district officer and the Board of Engineers for Rivers and Harbors that this locality is worthy of improvement in the manner proposed.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF LOWER THOROUGHFARE, AT WENONA, DEAL ISLAND, MARYLAND.

UNITED STATES ENGINEER OFFICE,
Baltimore, Md., April 18, 1907.

GENERAL: In compliance with Department letter of March 14, 1907, I have the honor to submit the following report upon the preliminary examination of Lower Thoroughfare, at or near Wenona, Deal Island, Maryland, "with a view to deepening the channel and constructing a basin," provided for in the river and harbor act of March 2, 1907.

Deal Island is about 3 miles long and half as wide, situated in Tangier Sound, Maryland, with the town of Wenona at the south end. About one-third of the area is under cultivation, but the 1,900 inhabitants of the island are chiefly engaged in fish, oyster, and crab traffic. There are 2 oyster and crab packing houses, 16 general stores, 2 schools, and 3 churches. The commerce, which is local in character (trading with Baltimore and Crisfield), is carried in 2 schooners, 31 sloops, 1 bugeye, and 300 other smaller sailing craft, aggregating 1,965 tons, with extreme loaded drafts from 2½ to 7½ feet. The receipts and shipments by water for the year ended April 1, 1907, were 10,251 tons, valued at $157,600, and consisted of general merchandise, cord wood, cordage, oysters, crabs, fish, and agricultural products. If adequate facilities are provided, one or more of the steamers navigating Chesapeake Bay will probably make a landing at Lower Thoroughfare, which will provide rapid transit for perishable fruits grown on the island and for the natural increase due to improved navigation and safe anchorage.

May 19, 1882, a channel 80 feet wide and 6 feet deep at mean low water, with a turning basin, was completed with an appropriation of $5,000 made by Congress March 3, 1881. Reports of a survey of this locality and of dredging operations are to be found beginning on page 889, Part 1, of Annual Report of Chief of Engineers for 1881, and on 853, Part 1, of the Annual Report of 1882. The project pro-

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posed in survey of 1881 was for a channel 100 feet wide and 7 feet deep at mean low water, with a turning basin at the upper end, at an estimated cost of $10,000. No further appropriations were made by Congress and there has been no expenditure for maintenance. The channel has deteriorated slowly, indicating that the cost of maintenance will be small. Since the improvement was made by the General Government about a quarter of a century ago the population appears to have increased about one-third and value of commerce about 30 per cent.

I am of opinion that the Lower Thoroughfare is worthy of improvement to the extent of restoring the channel and basin already dredged, modifying the angles, and constructing a landlocked basin, usually free from ice, as it is believed that it can be done for about 3 per cent of the value of existing commerce.

The records of this office furnish sufficient data for the preparation of a report, with plan and estimate of cost of improvement, and therefore no allotment for a survey is necessary.

Respectfully submitted.

R. L. HOXIE,
Lieut. Col., Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.

[Second indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., April 29, 1907.

Respectfully returned to the Chief of Engineers, United States Army.

The question under consideration within is the advisability of reopening the passage known as the Lower Thoroughfare, between Deal Island and Little Deal Island, Tangier Sound, Maryland, which in 1882 was dredged to a depth of 6 feet and width of 80 feet by the expenditure of $5,000 appropriated by the act of March 3, 1881.

The channel formerly dredged has deteriorated slowly, and its rehabilitation is desired in order that it may be possible for one or more of the steamers navigating Chesapeake Bay to reach the wharves. The receipts and shipments by water are stated to amount to about 10,000 tons per annum, valued at about $157,000, and to consist of general merchandise, cord wood, cordage, oysters, crabs, fish, and agricultural products.

From information now before the Board it is believed that the improvement proposed can be effected at a cost not disproportionate to the commerce of the locality, and sufficient data being available to the district officer for the preparation of a report with plan and estimate of cost the Board recommends that such a report be authorized.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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[Third indorsement.]

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, May 3, 1907.

Respectfully submitted to the Secretary of War.

This is a report on preliminary examination of Lower Thoroughfare, at or near Wenona, Deal Island, Maryland, authorized by the river and harbor act of March 2, 1907.

Inviting attention to the report of the Board of Engineers for Rivers and Harbors in the preceding indorsement, I recommend that preparation of plan and estimate of cost of improvement of the locality as proposed be authorized.

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

[Fourth indorsement.]

WAR DEPARTMENT,
May 4, 1907.

Approved as recommended by the Chief of Engineers.

ROBERT SHAW OLIVER,
Assistant Secretary of War.

PLAN AND ESTIMATE OF COST OF IMPROVEMENT OF LOWER THOROUGHFARE, AT WENONA, DEAL ISLAND, MARYLAND.

UNITED STATES ENGINEER OFFICE,
Baltimore, Md., May 21, 1907.

GENERAL: In compliance with Department letter of May 10, 1907, I have the honor to submit the following report upon survey of Lower Thoroughfare at or near Wenona, Deal Island, with a view to deepening the channel and constructing a basin, made pursuant to requirements of river and harbor act approved March 2, 1907.

Navigation of a channel 80 feet wide and 6 feet deep at mean low water, dredged in 1882, was, after trial, abandoned by steamers owing to sharp angles. It is now proposed to restore the channel and turning basin already dredged, widening the former 100 feet at the angles, so as to furnish an anchorage, and extending the latter 100 feet, thus forming easy navigation for steamers and a needed landlocked harbor of refuge near the upper end, as shown on blueprint herewith.

Estimate of cost of improvement.

Restoring existing channel and turning basin, 9,519 cubic yards, at 15 cents	$1,427.85
Dredging anchorage basin by widening channel at angles, 20,009 cubic yards, at 15 cents	3,001.35
Extending old basin 100 feet, 2,500 cubic yards, at 15 cents	375.00
	4,804.20
Engineering, superintendence, and contingencies, 10 per cent	480.42
Total	5,284.62

It is estimated that the annual cost of maintenance will be $200.

[illegible] range of tide, 2.2 feet.

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I am of opinion that an improvement to the extent indicated above is justified by commercial and other interests involved, both present and prospective.

Respectfully submitted.

R. L. HOXIE,
Lieut. Col., Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.

[Second indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., June 3, 1907.

Respectfully returned to the Chief of Engineers, United States Army.

The district officer proposes to restore to a depth of 6 feet the channel and turning basin heretofore dredged in Lower Thoroughfare between Deal Island and Little Deal Island, widening the channel 100 feet at the angles and extending the turning basin 100 feet, to provide easy navigation for steamers and a suitable protected anchorage. This work is estimated to cost $5,284.62 and its maintenance $200 per annum.

The commerce of the locality and the benefits to be expected from the improvement were considered in the district officer's report on the preliminary examination and in the Board's report of review. Comparing these benefits with the cost of the work now proposed and that formerly prosecuted, having in mind the small expenditure required for maintenance, the Board concurs with the district officer in the opinion that an improvement to the extent indicated above is justified by the commercial interests involved and that it is advisable for the United States to undertake the improvement.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 77.

ISLAIS CREEK, OR RIVER, CALIFORNIA.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF ISLAIS CREEK, OR RIVER, CALIFORNIA.

DECEMBER 5, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 4, 1907.

SIR: I have the honor to transmit, herewith, a letter from the Chief of Engineers, U. S. Army, dated June 6, 1907, together with copy of a report from Maj. William W. Harts, Corps of Engineers, dated April 25, 1907, of a preliminary examination of Islais River, California, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, June 6, 1907.

SIR: Under authority conferred by section 3 of the river and harbor act approved March 2, 1907, I have the honor to submit herewith for transmission to the Public Printer report of April 25, 1907, by Maj. William W. Harts, Corps of Engineers, on preliminary examination ordered by said act of March 2, 1907, of Islais River, California, "with a view of obtaining a depth of 26 feet from its mouth in San Francisco Bay for a distance of 1 mile."

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For the reasons given I concur in the opinion of the district officer and of the Board of Engineers for Rivers and Harbors that Islais River is not worthy of improvement by the United States in the manner proposed.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF ISLAIS CREEK, OR RIVER, CALIFORNIA.

UNITED STATES ENGINEER OFFICE,
San Francisco, Cal., April 25, 1907.

GENERAL: In compliance with the requirement of your letter of March 14, 1907, assigning to me the duty of making the preliminary examination of Islais River with a view to its improvement by the Federal Government, I have the honor to submit the following report:

Location and description.—Islais River, locally known as Islais Creek, is a shallow tidal stream lying in the southeast portion of the city of San Francisco, on the bay water front. It includes an area of about 425 acres of swamp land, entirely surrounded except on the bay side with high ground sloping back gradually from the water surface. Along the bay side is a causeway carrying a street and two railroad tracks.

At high water this marsh is nearly all covered with water, but at low tide it is an area of bare mud flats, shallow pools, and channels leading toward the outlet into the bay. The entire area lies wholly within the bulkhead line established by the Secretary of War in 1890 along the bay front of this portion of San Franscisco, and is practically all above the level of low water. All of the marsh of about 425 acres, as well as the area of about 350 acres along the bay front inside the bulkhead line but outside of the causeway above mentioned, has been sold by the State of California as tide and overflowed lands under a State act of about 1872, and is now in private ownership. A narrow channelway has been reserved, which is understood to be still the property of the State of California.

The tidal flow of the creek passes through a culvert in the causeway having an opening about 30 feet in width, over which culvert passes Kentucky street, a street-car line operated by the United Railroads of San Francisco, and a track belonging to the Santa Fe Railroad. The headroom under this culvert is not over 6 feet at low water, rendering it impossible for any floating craft, except perhaps skiffs, to pass in or out. The mouth of the creek is at this culvert. The locality was carefully inspected by me on March 13, 1907.

Previous examinations.—In 1884 a preliminary examination was made on this creek by Lieut. Col. G. H. Mendell, Corps of Engineers, under date of November 18, in accordance with an act of Congress of July 5, 1884. The following is quoted from his report:

> At some future time, when complications shall cease to exist, and when there shall appear to be a real need for increased commercial facilities, Islais Creek may be worthy of improvement, but under existing circumstances it is not so regarded

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A further examination by Col. W. H. Heuer, Corps of Engineers, was made on February 19, 1902. In his report Colonel Heuer said:

As there is no navigation on this creek, nor any probability of any, any further action on the part of the United States seems unnecessary.

History.—In 1878 the causeway above referred to was built across the lower part of this creek in prolongation of Kentucky street, San Francisco. This was made by authority of an act of the legislature of the State of California passed in 1876. A railroad trestle has been recently built across the southern part of the swamp and is now filled in with débris from the burned area of San Francisco. This embankment carries the rail line connecting with the Santa Fe Railroad freight slip. The Southern Pacific Company has also constructed through the central portion a high trestle, probably 25 to 30 feet above the water surface, for its "Bay-Shore Cut-Off" line. A wagon road also crosses the upper portion of the creek about one-half mile above Fifteenth avenue, in which road there is a small culvert a few feet wide. The causeway on which Kentucky street is located was originally built of riprap rock, and is about 100 feet wide. It is continuous throughout, except for the 30-foot culvert above referred to. This street line and causeway lie about one-half a mile shoreward of the bulkhead line, and until removed would offer an impassable barrier to any navigation should any be attempted. Openings with draw-spans would be necessary in all these rights of way if a navigable channel were to be constructed through the basin.

In 1880 the State board of harbor commissioners of California brought suit against the Potrero and Bay View Railroad Company, the original owners of the street car line, of which it is understood the United Railroads of San Francisco are successors, to compel the widening and opening of the culvert and to compel the construction of a drawbridge at that point. The court hearing the case acted favorably upon this suit and the railroad company was directed to remove the obstruction. This case was appealed by the street-car company to the supreme court of the State, which reversed the decision of the superior court and remanded the case. The causeway and bridge are therefore legal structures as far as the California courts are concerned. The act authorizing them requires the expense of any drawbridge to be paid by those desiring such an opening.

Navigation.—It is reported that years ago hay barges and occasionally scow schooners were accustomed to use this creek at certain stages of the tide, transporting hay to a wharf which is understood to still exist. Since the more recent construction of hay docks at other points of the city this need lapsed, and no other navigation is known to have used this creek up to the time of the construction of the causeway along Kentucky street in 1878, which put an effective bar in the way of any future use until portions of it are removed to create a new entrance.

Commerce.—It seems needless to say that there is not now and has not been any commerce in this creek since 1878, and the commerce before that time was insignificant and unimportant. There are at present on the shores of this basin several tanneries, several warehouses, a small chemical factory, and a few other small industries, transportation for which is now handled by land. Should an opening be made through the causeway of ample size and a deep channel

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cut into this basin the commerce arising from the present factories would probably not be of any special volume, and of itself would certainly not justify any considerable expenditure by the United States. There is no future commerce possible until the causeway is opened, and even then not until the basin is deepened for dockage of deep-draft vessels and the region further developed.

Improvement suggested.—Under the terms of the law, the examination should have for its purpose the determination of the worthiness of the locality for improvement, as follows:

Islais River, with a view of obtaining a depth of twenty-six feet from its mouth in San Francisco Bay for a distance of 1 mile.

The length of channel necessary to connect deep water of the bay with the actual mouth of the creek would need to be about 1⅛ miles, and the length of the creek itself is from a mile to a mile and a third farther. To dredge a channel a mile long, as specified in the act, and 26 feet deep inside the creek's mouth would be of no value unless the distance from the mouth should be also dredged out to the 26-foot depth. The minimum width of such a channel would probably be from 150 to 200 feet to permit its use by the deep-draft vessels it should accommodate. Such an improvement would be very expensive, both to construct and maintain. Training walls of rock might also need to be used to protect such a channel from shoaling.

Plans proposed by those interested.—A recent act of the legislature of California has enabled the condemnation by the State board of harbor commissioners of certain of the submerged areas to provide for a deep-draft basin, to be constructed under the authority of this board in the bed of this creek and to connect it with India Basin, lying to the south, provided the people of the State vote to issue bonds therefor. It is understood to be the purpose of those interested in the commerce of San Francisco Bay and of those interested in the real estate in this vicinity to create at this point a large inland dock or basin of ample depth, which would probably be a great benefit to the water front of San Francisco at some future time by providing additional wharfage for vessels in safe and sheltered places. For the use of this dock tolls would likely have to be charged to help defray the expenses of construction and maintenance. It is presumed that the material excavated from the basin would be used to reclaim adjoining lands which at present are practically valueless, but in case of such an improvement would be of high value for factory sites and warehouses.

The Western Pacific Railroad owns practically all of the water front along the northern bank of this creek, and the Southern Pacific Company owns many blocks near its upper end. These companies would be immensely benefited by adequate improvement in this locality. It is hoped by those interested that the Federal Government will assist this project by dredging the channel approach and relieve them of this expense.

Recommendations.—In view of the foregoing, it is my opinion that this locality is unworthy of improvement by the United States—

First. Because it is not properly a part of the navigable waters of the United States and because of the high cost of such improvement compared with the public benefits derivable.

Second. Because of the lack of any present public necessity therefor.

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Third. Because the creek lies wholly within the bulkhead line established years ago by the United States and is now private property.

Such improvement as is proposed is not, in my opinion, public work for which the General Government should pay, but is wholly local in its nature, being the construction of docks and the development of the city's water front, the expenses of which should be borne by those directly interested.

Respectfully submitted.

WM. W. HARTS,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.

[Second indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., May 20, 1907.

Respectfully returned to the Chief of Engineers, United States Army.

The within comprehensive report, which describes quite fully the conditions at this locality, as well as such other records as have been published in the reports of the Chief of Engineers relative to the improvement of this stream, have been reviewed by the Board. The district officer invited those interested to submit statements and arguments in behalf of the improvement to the Board of Engineers for Rivers and Harbors, but no communications in response thereto have been received.

This river—or creek, as the name appears on maps of the locality—is a shallow estuary of San Francisco Bay, practically dry at low tide, lying wholly within the approved bulkhead line established by the Secretary of War in 1890. It is crossed near its mouth by a causeway on which is located Kentucky street, a street-car line, and a railway line. The only opening through the causeway is a culvert 30 feet in width with a headroom of but 6 feet at low water, which, independent of the shallowness of the stream, effectually prevents any navigation under present conditions. This being the case, there is no commerce now, and, in the opinion of the Board, the improvement contemplated in the act would not result in the development of one at all commensurate with the cost; and even if there were a prospect of such development, the work would be local in its character and, in the opinion of the Board, not justifiable at the expense of the United States, as the resulting benefits would not accrue to general navigation and commercial interests.

In view of the foregoing, the Board expresses the opinion, concurring with the views of the district officer, that the improvement of "Islais River, with a view of obtaining a depth of 26 feet from its mouth in San Francisco Bay for a distance of 1 mile," is a work not worthy of being undertaken by the United States.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 78.

LITTLE RIVER, DELAWARE.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF LITTLE RIVER, DELAWARE.

DECEMBER 5, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed

WAR DEPARTMENT,
Washington, December 4, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated June 14, 1907, together with copy of a report from Maj. C. A. F. Flagler, Corps of Engineers, dated May 6, 1907, of a preliminary examination of Little River, Delaware, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, June 14, 1907.

SIR: Under authority conferred by section 3 of the river and harbor act, approved March 2, 1907, I have the honor to submit herewith for transmission to the Public Printer report of May 6, 1907, by Maj. C. A. F. Flagler, Corps of Engineers, on preliminary examination ordered by said act of March 2, 1907, of Little River, Delaware, from the mouth of the same to the town of Little Creek.

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For the reasons given, I concur in the opinion of the district officer, of the division engineer, and of the Board of Engineers for rivers and harbors that Little River is not at present worthy of improvement by the United States.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF LITTLE RIVER, DELAWARE, FROM ITS MOUTH TO THE TOWN OF LITTLE CREEK.

ENGINEER OFFICE, UNITED STATES ARMY,
Wilmington, Del., May 6, 1907.

GENERAL: I have the honor to submit the following report of the preliminary examination of Little River, Delaware, assigned to me by letter from the Office of the Chief of Engineers dated March 14, 1907.

Section 3 of the river and harbor act of March 2, 1907, provides for making preliminary examinations and surveys as follows:

DELAWARE.

* * * * * *

Little River, from the mouth of the same to the town of Little Creek.

* * * * * * *

At 1 p. m. April 11, 1907, I held an informal hearing at Little Creek, to which those interested had been invited by posters and circular letters. At the conclusion thereof I made an examination of the stream in a launch from Little Creek to the mouth.

Little River is situated in Kent County, Del., with its mouth about 70 miles below Philadelphia. It is a narrow tidal stream, about 8 miles long; its shores up to Little Creek are marsh land, a little above high water. The width averages about 70 feet up to Little Creek, which is practically the head of navigation, where it is only about 35 feet wide. There is a drawbridge at Little Creek, but none between that point and the mouth.

A preliminary examination was made in 1880, and report thereon submitted to the Chief of Engineers by Col. J. N. Macomb, Corps of Engineers, December 31, 1880 (Annual Report of the Chief of Engineers for 1881, p. 829). No recommendation was made therein, but a project was submitted for a channel depth of 6 feet at mean low water, with four cut-offs to straighten the stream, at an estimated cost of $17,200. No appropriation was made thereon.

The desires for improvement as expressed at the hearing were, first, to permit a freight and passenger boat, similar to those used on other Delaware rivers, to operate between Little Creek and Philadelphia; and, second, to permit the oyster boats operated by oystermen living at Little Creek to enter and come up the river. These oyster boats fish the Delaware Bay oyster beds from Kitts Hammock to Mahon River. They are about 15-ton boats, some as much as 50 feet long, with a light draft of 5 to 5½ feet, and a loaded draft of 7 feet. About forty of these boats are owned or operated by residents of Little Creek. They now use Mahon River as a harbor, and the oystermen go and come to their homes from there, about 3 miles over

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a good road. It was stated that the water was fresh enough in Little River at Little Creek for the fattening of oysters for the market, and that if the oyster boats could come up the river, or lie inside the mouth, the oysters would be fattened at and shipped from Little Creek. The men could also reach their homes by water. At present the oysters are almost all taken across to the New Jersey shore, fattened in the Cohansey River, and shipped from Greenwich on that river.

There is but little commerce on Little River at the present time, what was there years ago having almost passed away owing to the deterioration of the stream. About 300 tons of coal are brought in annually by water, and some marsh hay is so shipped.

There are in the vicinity of the river 126 farms, containing about 26,000 acres of fertile land under cultivation, which, according to the assessment of 1907, were valued at $1,000,000. The annual products of these farms, the salt hay gathered from the marshes, and the oystering at the mouth of the river are reported as follows:

One hundred and fifty thousand bushels of wheat, 200,000 bushels of corn, 10,000 bushels of potatoes, 1,000 tons of tomatoes; poultry worth about $9,000; 20,000 baskets of apples, 25,000 baskets of peaches, 40,000 baskets of pears—valued at $30,000; 1,500 calves, 2,000 lambs, 4,000 hogs—valued at $43,000; oysters shipped from oyster beds outside the mouth of the river, about $100,000; a total value of about $488,000.

A canning factory was operated at Little Creek until three years ago, when it was shut down owing to failure of water transportation. The annual product of this factory was from 20,000 to 25,000 cases, valued at between $40,000 and $50,000.

With the exceptions stated above in regard to coal and marsh hay, shipments are now made by rail after hauling by wagon to Dover or Wyoming, Del., 5 to 8 miles, involving a great delay in time and largely increased cost of shipment.

No statements were made respecting freight received, except as to coal and fertilizers—400 tons coal and about 10 tons fertilizer to each farm, or 1,260 tons in all. The railroad rate on the latter from Philadelphia is $2.50 on a single ton and $1.50 per ton carload rate. By water it would be $1.10 per ton either way.

Statements were made that the above production would be very largely increased if assured navigation of the river was obtained.

No map is available giving sufficient data of Little River to be of value. The river is very tortuous and many of the bends exceedingly sharp; the minimum low-water depth in the channel at present is about 5 feet, though occasional lumps were found with a depth of only 3 feet. These are said to be tussocks broken off from the adjacent marsh that could be easily removed. On the bar at the mouth the depth is less, probably not exceeding 2½ feet at mean low water.

Improvement to permit the navigation desired would, in my opinion, involve the creation of a channel 6 feet deep at mean low water and would require the dredging of a channel at the mouth, the making of at least six cut-offs through marsh land, the deepening of about one-third of the channel in the present river, the trimming of points and widening of channel in many places, and the excavation of a turning basin at Little Creek.

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I am informed by Mr. Howard McGonigal, of Little Creek, that funds have been raised by private subscription for making one of the cut-offs.

I have carefully considered the work to be done and the statistics of the interests involved, and am compelled to state as my opinion that Little River is not at present worthy of improvement by the United States. No survey thereof is recommended.

Very respectfully, your obedient servant,

C. A. F. FLAGLER,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

U. S. ENGINEER OFFICE, EASTERN DIVISION,
New York City, May 7, 1907.

Respectfully forwarded to the Chief of Engineers, United States Army, concurring in opinion of district officer.

AMOS STICKNEY,
Colonel, Corps of Engineers,
Division Engineer.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., June 3, 1907.

Respectfully returned to the Chief of Engineers, United States Army.

Little River is a narrow tidal stream about 8 miles long, emptying into Delaware Bay about 70 miles below Philadelphia. A preliminary examination of the stream was made in 1880 by Col. J. N. Macomb, Corps of Engineers, who submitted without recommendation a project contemplating a depth of 6 feet at mean low water up to Little Creek landing, at an estimated cost of $17,200. No appropriation for this river was provided by Congress, and no examinations have since been made looking solely to its improvement.

The work now desired is the construction of a channel to afford access to the town of Little Creek for freight, passenger, and oyster boats, and the district officer believes that a suitable channel for these purposes is one having a depth of 6 feet at mean low water. In addition to a large amount of dredging in the river, six cut-offs through marsh land would have to be made, and an entrance channel provided at the mouth.

Information as to the products and the commercial interests of the vicinity is given by the district officer, who invited interested persons to submit statements or arguments to the Board in behalf of the proposed improvement. Several such communications have been received, but they contain no convincing statistics or statements of fact establishing an important commercial necessity for the improvement. There is but little commerce on Little River at the present time, and owing to deterioration of the channel the traffic formerly existing has passed away. About 300 tons of coal are brought in

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annually by water, and some marsh hay is shipped by this route, but with these exceptions the output of the country goes to Dover or Wyoming, Del., by wagon, thence being transported to market by rail. The chief commodities so shipped are wheat, corn, potatoes, tomatoes, fruit, and live stock. While an oyster business of some importance is carried on by residents of Little Creek, shipments are made from points on Delaware Bay near the oyster beds.

While the improvement would afford some convenience to the oystermen and probably result in some saving in freight charges on other products, the Board is of the opinion that the advantages thus gained would not be sufficient to justify the expenditure involved, and it believes that the commerce of the stream is not of sufficient magnitude and importance to yield public benefits commensurate with the outlay necessary for the proposed work. The Board therefore concurs with the district officer and the division engineer in the opinion that it is not at present advisable for the United States to undertake the improvement of Little River, Delaware, from the mouth of the same to the town of Little Creek.

For the Board:

D. W. Lockwood,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 79.

MINISCEONGO RIVER, NEW YORK.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION, WITH PLAN AND ESTIMATE OF COST OF IMPROVEMENT, OF MINISCEONGO RIVER, NEW YORK.

DECEMBER 5, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 4, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated June 7, 1907, together with copies of reports from Col. D. W. Lockwood, Corps of Engineers, dated April 26 and May 21, 1907, of a preliminary examination of Minisceongo River, New York, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, June 7, 1907.

SIR: Under authority conferred by section 3 of the river and harbor act approved March 2, 1907, I have the honor to submit herewith for transmission to the Public Printer reports of April 26 and May 21, 1907, by Col. D. W. Lockwood, Corps of Engineers, on preliminary examination with plan and estimate of cost of improvement of Minisceongo River, New York, with a view to obtaining a depth of 7 feet, ordered by said act of March 2, 1907.

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The plan of improvement presented is for a channel 7 feet in depth at mean low water and 80 feet wide at bottom, extending for a distance of about 1.5 miles above the mouth of the river, at an estimated cost of $22,632. The proposed channel does not follow the course of the stream, but is laid across a marshy point to avoid a bend too sharp for easy navigation. In the opinion of the local officer the right of way for this cut-off should be donated to the United States free of cost and a water pipe crossing the river near its mouth should be lowered to a depth of 10 feet, also without expense to the United States.

I concur in the views of the local officer and the Board of Engineers for Rivers and Harbors that Minisceongo River is worthy of improvement in the manner proposed and that any appropriations for the work should be made conditional upon donation of right of way and lowering of water pipe as indicated above.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF MINISCEONGO RIVER, NEW YORK.

UNITED STATES ENGINEER OFFICE,
New York City, April 26, 1907.

GENERAL: I have the honor to submit the following report of a preliminary examination of Minisceongo River, New York, provided for in the river and harbor act of March 2, 1907, this duty having been assigned me by Department letter of March 14, 1907.

The river and harbor act of 1882 provided for the survey of this stream "at its outlet into the Hudson River," and under date of November 28, 1883, Col. John Newton, Corps of Engineers, submitted plans and estimates for securing 10 feet depth down to Grassy Point, by dredging and a system of dikes. Nothing was suggested about securing deeper water in the river itself.

Under date of October 23, 1902, Col. S. M. Mansfield, Corps of Engineers, submitted a report of a preliminary examination of this stream, stating that in his opinion it was worthy of improvement, and recommending a survey with a view to estimating the cost of a channel 8 feet deep and from 80 to 100 feet wide. This recommendation having been approved in the regular way, a survey was made under the direction of Col. Amos Stickney, Corps of Engineers, whose report is dated December 5, 1903, and contains estimates of cost of improvement based on a channel 9 feet deep at mean low water and 80 feet wide. This report was approved by the Board of Engineers for Rivers and Harbors, the Chief of Engineers, and the Secretary of War, and with the map of survey contains all the information needed to make an estimate of cost for a 7-foot channel 80 feet wide.[a]

[a] These reports are printed in House Doc. No. 300, 58th Cong., 2d sess.; and page 1069 of the Annual Report of the Chief of Engineers for 1904.

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The Minisceongo is a small tidal river emptying into the Hudson River at Stony Point, about 33 miles above New York City. It is a very crooked stream, having a depth for much of its length of 7 feet at mean low water, with reaches of deeper water and a bar near its mouth with less than 5 feet.

The part that may be considered navigable extends from the mouth to a point about 1.5 miles above. It is crossed near the mouth by a bridge, which has two draw openings. Just below the bridge a pipe line, belonging to the Haverstraw Water Company, is laid, having over it only 6 feet of water.

About 1 mile above the mouth there is a very sharp bend with so short a radius that it is not practicable, in my opinion, to excavate a suitable channel following the course of the stream.

In my opinion, the stream is worthy of improvement to the extent of providing a channel 80 feet wide and 7 feet deep at mean low water. This width is about as great as the width of the stream will admit of, and the depth as much as can be carried out to deep water in the Hudson.

The brick barges are from 110 to 130 feet long, from 28 to 36 feet wide, and draw from 5½ to 10 feet, or as much as the depth of water will admit of up to 10 feet.

I, however, recommend the improvement only on condition that it is made with the cut-off at the bend, 1 mile from the mouth, and that the right of way be secured without cost to the United States. The water pipe that crosses the stream below the bridge and near the mouth of the river, and over which there is now 6 feet at mean low water, should be lowered 4 feet, so that the bottom can be dredged to a depth of 7 feet, mean low water, without disturbing it.

The commerce reported in 1892 was as follows:

Brick		80,000,000
Sand	cubic yards	12,000
Wood	cords	10,000
Coal	tons	2,000
Coal dust	do	5,000

The total commerce as reported at present amounts to between 170,000 and 175,000 tons, nearly all of which consists of brick.

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Very respectfully, your obedient servant,

D. W. LOCKWOOD,
Colonel, Corps of Engineers.

Brig. Gen A. MACKENZIE,
Chief of Engineers, U. S. A.

[Second indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., May 7, 1907.

Respectfully returned to the Chief of Engineers, United States Army.

Under the act of June 13, 1902, an examination of Minisceongo River was made, and in reviewing the report thereon the Board of Engineers for Rivers and Harbors expressed a favorable opinion on the desirability of the improvement and the project then presented,

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which contemplated a depth of 9 feet, but no funds have been appropriated for the work.

The present inquiry is, by the terms of the act requiring the examination, restricted to a depth of 7 feet. The district officer's report is favorable, and he states that the information needed on which to base an estimate of cost is now available.

The Board concurs with the district officer in believing this river worthy of improvement, and therefore recommends that an estimate of cost be authorized.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

[Third indorsement.]

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, May 11, 1907.

Respectfully submitted to the Secretary of War.

This is a report on preliminary examination of Minisceongo River, New York, authorized by the river and harbor act of March 2, 1907.

Inviting attention to the report of the Board of Engineers for Rivers and Harbors, in the preceding indorsement, I recommend that preparation of an estimate of cost of improvement of the locality, as proposed, be authorized.

FREDERIC V. ABBOT,
Acting Chief of Engineers.

[Fourth indorsement.]

WAR DEPARTMENT,
May 14, 1907.

Approved.

ROBERT SHAW OLIVER,
Assistant Secretary of War.

PLAN AND ESTIMATE OF COST OF IMPROVEMENT OF MINISCEONGO RIVER, NEW YORK.

UNITED STATES ENGINEER OFFICE,
New York City, May 21, 1907.

GENERAL: In compliance with instructions contained in Department letter of May 15, 1907, I have the honor to submit herewith an estimate of cost of improving Minisceongo River, with a view to obtaining a depth of 7 feet. The plane of reference is that of mean low tide. The width of channel is 80 feet on the bottom, which is as much as the natural width of the stream will permit of, the side slopes being 1 on 3.

Estimate of cost.

Dredging 82,000 cubic yards sand and mud, at 24 cents	$19,680
Contingencies of engineering, etc	2,952
Total	22,632

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This estimate is for the route via the cut-off about 1 mile from the mouth of the river, but does not include the cost of right of way across the marshy point, as this should be secured to the United States free of charge by those interested in the improvement.

To follow the course of the stream around the point would involve a curve of too short radius for easy navigation with the barges in common use in the transportation of brick, and on this account no estimate is submitted for this route. The Board of Engineers for Rivers and Harbors in its report dated December 14, 1903, on the survey and estimate submitted by Col. Amos Stickney under date of December 5, 1903, stated as follows:

A proviso should be inserted when appropriation is made prohibiting the inauguration of dredging before the land for the cut-off is donated to the United States, and the water pipe below the bridge removed or lowered to a depth of 12 feet below mean low tide where it crosses the proposed channel.

The commerce of this river, as stated in the preliminary report, amounts to between 170,000 and 175,000 tons annually, and consists principally of brick, with some coal required at the kilns. An increase in other articles may be reasonably expected with increased facilities. The advantages to existing commerce that would result from a deeper and wider channel would be in the use of larger and deeper draft brick barges and in cheapening towage charges, or generally in lowering freight rates.

In my opinion the improvement of the Minisceongo River by providing a channel 7 feet deep at mean low tide and 80 feet wide at the bottom, via the cut-off, the land for which to be donated to the United States free of cost, and the water pipe below the bridge to be lowered to a depth of 10 feet, without expense to the United States, is justified by the commercial interests involved.

Very respectfully, your obedient servant,

D. W. LOCKWOOD,
Colonel, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.

[Second indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., May 27, 1907.

Respectfully returned to the Chief of Engineers, United States Army.

The district officer submits an estimate for the improvement of Minisceongo River, in the sum of $22,632, to provide a channel 7 feet in depth at mean low tide and 80 feet bottom width, extending for a distance of about 1½ miles above the mouth.

The plan provides for a cut-off about 1 mile above the mouth, the right of way to be secured to the United States free of charge, and a pipe line crossing the river near its mouth, with only 6 feet of water over it, to be lowered to a depth of 10 feet, also without expense to the United States. No estimate is submitted for maintenance, but it is believed this item will be small.

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Having compared the extent and value of the commerce involved with the cost of the work, the Board expresses the opinion, concurring with the views of the district officer, that the improvement is one worthy of being undertaken by the General Government and in accordance with the plans and conditions proposed.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 80.

BRANFORD HARBOR, CONNECTICUT.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF BRANFORD HARBOR, CONNECTICUT.

DECEMBER 5, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 4, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated June 17, 1907, together with copy of a report from Maj. Harry Taylor, Corps of Engineers, dated May 17, 1907, of a preliminary examination of Branford Harbor, Connecticut, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, June 17, 1907.

SIR: Under authority conferred by section 3 of the river and harbor act approved March 2, 1907, I have the honor to submit herewith, for transmission to the Public Printer, report of May 17, 1907, by Maj. Harry Taylor, Corps of Engineers, on preliminary examination of Branford Harbor, Connecticut, provided for by said act of March 2, 1907.

Branford Harbor is being improved under a project which aims to secure a channel 8½ feet deep and 100 feet wide from the upper docks to deep water in the outer harbor.

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For the reasons given by them, I concur in the opinion of the district officer, of the division engineer, and of the Board of Engineers for Rivers and Harbors that this locality is not worthy of further improvement by the General Government at the present time.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF BRANFORD HARBOR, CONNECTICUT.

ENGINEER OFFICE, UNITED STATES ARMY,
New London, Conn., May 17, 1907.

GENERAL: In compliance with instructions from your office and the requirements of the act of Congress approved March 2, 1907, I have the honor to submit the following report of a preliminary examination of Branford Harbor, Connecticut.

Branford Harbor is located on the north shore of Long Island Sound, its entrance being about 4 miles east of the entrance to New Haven Harbor. It consists of three distinct parts: The outer harbor, which is approximately 1 mile wide and three-quarters of a mile deep; the inner harbor, separated from the outer harbor by a series of rocks, the principal ones of which are known as "The Mermaids," which is about half a mile in diameter; and the river, which empties into the inner harbor from the northeast. The depths shown in the different portions of the harbor, according to the latest Coast and Geodetic Survey map, are: At the outside of the outer harbor 15 to 16 feet, gradually shoaling to a depth of 8 feet near "The Mermaids;" through the inner harbor, from the "The Mermaids" to the mouth of Branford River, 7 to 8 feet; up the river for a distance of approximately three-quarters of a mile depths of 12 feet or greater are found. But it is known that since the Coast and Geodetic Survey chart referred to was published the depths in the inner harbor have shoaled to the extent of 2 feet or more, so that the available depths across the inner harbor do not now exceed 6 feet, and it is presumed that the depths in the outer harbor have also shoaled for a considerable distance from "The Mermaids" to about the same extent that the inner harbor has shoaled.

The project for the improvement of this harbor, adopted by the act of June 13, 1902, provides for dredging and maintaining an 8½-foot channel 100 feet wide in the upper part of the river between the lower and upper docks at an estimated first cost of $10,000. Under this project prior to 1907 $8,000 had been appropriated. The act of March 2, 1907, appropriated $5,000 for the improvement of Branford Harbor and authorized the Secretary of War, in his discretion, to continue the channel, with the dimensions previously authorized, through the shoals to deep water in the outer harbor. With the funds thus provided and under this authority it is expected that a channel of project dimensions—that is, 8½ feet in depth and 100 feet in width will be provided from the upper docks to deep water in the outer harbor.

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The commerce of this harbor for the calendar year 1906, as compiled from the reports furnished by interested parties, amounted to 25,960 tons, valued at $193,471.76, all of which was in receipts, the principal items being coal and pig iron.

It is understood that 12½ feet at low water is desired. This would require the dredging of at least a mile of channel, which would be likely to shoal and would require constant redredging in order to maintain it. A rough estimate indicates that such a channel would require the removal of upwards of 125,000 cubic yards of material, and the indications are that rock would be encountered in considerable quantities in completing it. An estimate of the cost can not be submitted without a detailed survey, which it is estimated would cost $500.

It is to be noted that the commerce of Branford is comparatively small, and that of this commerce 20,686 tons, valued at $149,569.76, was received by one firm—that is, of the total commerce 80 per cent of the tonnage and 77.3 per cent of the valuation is that due to a single firm.

In view of the relatively large cost of the improvement and the small general benefit to be gained by such an improvement I am obliged to report that, in my opinion, the locality is not worthy of further improvement by the General Government at this time.

Very respectfully, your obedient servant,

HARRY TAYLOR,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

NORTHEAST DIVISION ENGINEER OFFICE,
New York, May 20, 1907.

Respectfully forwarded to the Chief of Engineers, United States Army, concurring in the views of the district officer.

AMOS STICKNEY,
Colonel, Corps of Engineers,
Division Engineer.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., June 10, 1907.

Respectfully returned to the Chief of Engineers, United States Army.

There has been appropriated for the improvement of this harbor $13,000, and it is expected with the expenditure of available funds to provide a channel 8½ feet in depth and 100 feet in width from the outer harbor to the upper dock in the river. It is stated within that the desire of those interested is for an increase in depth to 12½ feet. The district officer expresses the opinion, in which the division engineer concurs, that the locality is not worthy of further improvement by the General Government at this time.

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Any increase in depth over that provided for by the existing project will require considerable dredging in extending the length as well as the depth of the channel already dredged, and it seems probable that rock would be encountered.

The commerce of the locality, which has averaged about 25,000 tons in the past five years, is not increasing in extent, and consists principally in the receipt of coal and pig iron, the greater part of which is reported to be in the interests of one firm. This commerce appears to be reasonably well provided for by the facilities already afforded.

The district officer notified the president of the Branford Board of Trade that statements and arguments bearing upon the necessities for further improvement might be submitted to the Board, but no such communications have been received.

In view of the facts stated, coupled with the probable large cost of any extension of the improvement, the Board concurs with the views of the district officer and the division engineer that at this time no further improvement of Branford Harbor is advisable.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 81.

DUNKIRK HARBOR, NEW YORK.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF DUNKIRK HARBOR, NEW YORK.

DECEMBER 5, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 4, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated June 21, 1907, together with copy of a report from Col. H. M. Adams, Corps of Engineers, dated May 9, 1907, of a preliminary examination of Dunkirk Harbor, New York, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, June 21, 1907.

SIR: Under authority conferred by section 3 of the river and harbor act, approved March 2, 1907, I have the honor to submit herewith for transmission to the Public Printer report of May 9, 1907, by Col. H. M. Adams, Corps of Engineers, on preliminary examination of Dunkirk Harbor, New York, ordered by said act.

As a result of work already done at Dunkirk there has been secured by dredging and breakwater construction a protected harbor suitable for vessels drawing 16 feet at mean lake level.

For the reasons given, I concur in the opinion expressed by the local engineer officer and by the Board of Engineers for Rivers and

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Harbors that Dunkirk Harbor is unworthy of further improvement than maintenance of the existing works.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF DUNKIRK HARBOR, NEW YORK.

UNITED STATES ENGINEER OFFICE,
Buffalo, N. Y., May 9, 1907.

GENERAL: I have the honor to submit the following report in duplicate on a preliminary examination of Dunkirk Harbor, New York, provided for in the river and harbor act of March 2, 1907, and assigned to my charge by letter of March 14, 1907.

This is an artificially protected harbor in an indentation of the south shore of Lake Erie, 40 miles southwest from Buffalo, N. Y. It lies between Point Gratiot on the west and Battery Point on the east. The distance between these points is 9,600 feet, and the maximum breadth of the indentation is 3,600 feet. The original depth of water was about 10 feet, and from 15 to 16 feet to underlying rock.

The works at this harbor consist of a west pier 1,410 feet long and of a detached breakwater 2,860 feet long, one part of which, 2,300 feet long, is nearly parallel with the shore, and the other part, 560 feet long, is nearly parallel with the channel entrance, which is 170 feet wide.

An entrance channel and harbor basin, containing about 65 acres in all, have been excavated to a depth suitable for vessels drawing 16 feet at mean lake level. This work was completed in 1898 and no work except minor repairs to structures has been done since, as the project is completed except maintenance.

The west pier has 1,035 feet of concrete superstructure and 375 feet of timber superstructure. The breakwater has a timber superstructure for its entire length except the easterly 310 feet, where it is concrete.

While the timber portions of these structures are in poor condition they are performing their functions, and the entrance channel and harbor basin are believed to be ample in depth and size for the present and prospective needs of the harbor. It can not be learned that any new transportation lines or new business enterprises using the harbor have been established since it was improved and deepened in 1898.

The lake commerce of Dunkirk is small and is not increasing. The following are the commercial statistics for the calendar year 1906, as furnished by the collector of customs at Dunkirk:

Total arrivals and departures:[a]	
Number	111
Tonnage	11,310
Receipts by lake, lumber—tons	1,130
Shipments by lake	None
Enrolled tonnage of port (9 fishing tugs and 1 barge)	555
Value of imports by rail	$29,674.89
Amount of revenue collected (rail commerce)	$9,597.06

[a] The arrivals and departures were made by one passenger excursion steamer and five fishing tugs.

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A report showing plan and estimate of cost for an "easterly breakwater," an extension of the existing breakwater 1,300 feet easterly, was submitted by Maj. T. W. Symons, Corps of Engineers, October 24, 1899, and printed in House Document No. 74, Fifty-sixth Congress, first session. The estimated cost was $74,827.50, but no funds were appropriated for the work.

The sum of $19,343.14 is now available for maintenance at Dunkirk Harbor, and it is thought that this amount, with small appropriations from time to time, will maintain the structures and channels in their present condition. It is estimated that the cost of making with concrete the necessary repairs to that portion of the breakwater wrecked by storm of January 20, 1907, would be $57,000, or $71.25 per linear foot.

It is believed that Dunkirk Harbor is unworthy of further improvement than maintenance of the existing project for reasons shown above, viz, its small commercial importance and the failure of those interested to take advantage of the present harbor facilities.

* * * * * * *

Very respectfully, your obedient servant,

H. M. ADAMS,
Colonel, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.

[Second indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., June 17, 1907.

Respectfully returned to the Chief of Engineers, United States Army.

The General Government has expended nearly $1,000,000 in the improvement of this harbor, and has, by means of jetties and dredging, provided facilities for vessels of 16 feet draft.

The commerce of the port has never been extensive, having averaged about 3,700 tons for the past eight years, and it is now almost insignificant, consisting of less than 2,000 tons of lumber.

The expenditures already made, if considered on a basis of 3 per cent interest, would represent an annual charge of about $8 per ton on the present average commerce, not taking into account the expense of annual maintenance, and there is no information before the Board which indicates any material expansion in lake traffic.

The president of the Dunkirk Board of Trade was informed by the district officer that he might submit to the Board of Engineers for Rivers and Harbors statements, facts, and arguments bearing upon the necessity of the further improvement of Dunkirk Harbor. The Board received a letter requesting that a committee of interested persons be given an opportunity of appearing before the Board at Erie, Pa., where a public hearing was to be held on June 6, 1907, with reference to other matters. This request was complied with, but no one appeared. The Board was informed, however, that information in writing in regard to Dunkirk Harbor would in due time be forwarded to the Board's office in Washington. No further communications have been received.

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In view of the small commerce, present and prospective, the large expenditures already made for this improvement, and the belief that an extension of facilities would not result in benefits to the general public commensurate with the cost, the Board concurs with the district officer that Dunkirk Harbor is unworthy of improvement beyond the maintenance of the existing project.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 82.

NEWPORT HARBOR, CALIFORNIA.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF NEWPORT HARBOR, CALIFORNIA.

DECEMBER 5, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 4, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated June 14, 1907, together with copy of a report from Capt. Amos A. Fries, Corps of Engineers, dated May 9, 1907, of a preliminary examination of Newport Harbor, California, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, June 14, 1907.

SIR: Under authority conferred by section 3 of the river and harbor act approved March 2, 1907, I have the honor to submit herewith for transmission to the Public Printer report of May 9, 1907, by Capt. Amos A. Fries, Corps of Engineers, on preliminary examination of Newport Harbor, California, ordered by said act of March 2, 1907.

For the reasons given, I concur in the opinion of the local officer and of the Board of Engineers for Rivers and Harbors that Newport

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Harbor, California, is not worthy of improvement by the General Government at the present time.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF NEWPORT HARBOR, CALIFORNIA.

UNITED STATES ENGINEER OFFICE,
Los Angeles, Cal., May 9, 1907.

GENERAL: I have the honor to submit the following report on a preliminary examination of Newport Bay, made in compliance with provisions of river and harbor act approved March 2, 1907, and Department letter of March 14, 1907.

A survey of Newport Bay, California, was made in 1888 by Maj. W. H. H. Benyaurd, Corps of Engineers, in compliance with provisions contained in river and harbor act of August 5, 1886. Major Benyaurd, in his report of February 15, 1888 (see Annual Report of the Chief of Engineers for 1888, p. 2118), states in part as follows:

> The harbor of Newport is an estuary extending from the sea entrance to the "Landing," a distance of about 2½ miles, having a mean low-water width of from 200 to 800 feet. In its lower reach it is separated from the ocean on the south by a narrow strip of sand, over which the sea breaks during the prevalence of southern storms. From the entrance a channel depth of 7 feet at mean low water can be carried for about two-thirds of a mile, thence to the mouth of the Santa Ana River (about one-half mile below the "Landing") the depth gradually increases to about 10 feet, thence to the "Landing" the depth varies from 7 to 10 feet, the width of the channel varying from 50 to 400 feet. * * *
>
> A bar extends across the entrance, over which the sea breaks at all times. It has no fixed channel and is subject to constant and at times rapid changes, these changes depending generally upon the direction of the prevailing winds. These, in the summer, come from southwest and west, with occasional land breezes in the morning, and in the winter are southerly, with occasional southeasters. During the fall and winter months the channel is close to the rocks on the easterly side and gradually shifts westward, and in the summer is found near the sand-spit on the opposite side. For the past few years, according to the statements of pilots, it has gone through these changes, with the exception of the winter of 1886–87, when the channel remained on the west side, and was so found at the time of the present survey in March last.
>
> * * * * * * *
>
> The area of the estuary (including the bordering lands of the Santa Ana River) is very large, and is traversed by numerous sloughs and interspersed with low mud flats and salt marshes.
>
> It is not very easy to determine the limits of the tidal area, though if we consider the latter as extending from the entrance up the main slough to the head of the lagoon, up Santa Ana River as far as the bridge, and including about one-half of the lower mud flats exposed at low water, we would have a tidal area of about 1.25 square miles, which would give on a spring tide of 5 feet a tidal prism of about 175,000,000 cubic feet. In this I have considered only the volume due to the tidal flow, omitting what might be contributed by the Santa Ana River after the heavy rains of the winter season.
>
> The area of the section at the head of the entrance at the time of the survey, through which the total volume of the tidal prism passed, was about 2,500 square feet at mean low tide, the width being 200 feet and the greatest depth 20 feet. Going seaward the width gradually increased and the depth decreased until, at the outer limit of the entrance, 2,300 feet distant, the width was 2,200 feet and the greatest depth 5 feet, the sectional area being about 2,800

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square feet, the channel on the bar at the time being to the west of the middle ground. When near the bluffs and east of the middle ground the channel is in its most favorable condition for navigation; it gives better depths, is straighter, and does not change its direction so quickly as the other, but at best it gives but from 9 to 11 feet at the highest tides.

* * * * * * *

I append a statement of the commerce of Newport Harbor. It was at one time the shipping and distributing point for the adjacent country. The construction of the railroad to Santa Ana, 12 miles distant, changed the method of transportation, and the business of the harbor declined. One small steamer arrives twice a month from San Francisco. This, with an occasional small lumber vessel, constitutes the carrying trade of the harbor. The cost of construction and maintenance of the works intended to give a permanent increase of depth at the harbor is entirely incommensurate with the advantages that would accrue to commerce.

The difficulties attending navigation over the bar prompted the steamship company to investigate the matter of building a wharf at a point some 3 miles up the coast, where still water existed, though otherwise the sea broke along the entire length of the beach. At the request of the agent the party was directed to make a survey of the locality, the results of which are plotted on the map, and designated the "New Landing." The still water is caused by a deep pocket making up close to the shore, with sand spits to eastward and westward. These spits have from 5 to 6 fathoms of water upon them for a distance of about 2,500 feet from the beach, while in the depression the 10-fathom curve approaches within about 1,200 feet of the shore line. It is generally smooth enough here to land a boat when the bar is in dangerous condition.

The present condition of Newport Bay is practically the same as that reported by Major Benyaurd in 1888, except that the sea, so far as known, does not break over any part of the narrow sand strip. The city of Newport Beach has now a population estimated at 1,000 to 1,500. This population is probably doubled during the summer months. Apparently the channels have the same widths and depths as stated above, except that the narrowest width at the entrance is now probably about 400 feet. The proposed wharf mentioned in the last paragraph quoted above was built not long after Major Benyaurd's report was made, and it has been in use since that time.

There is ample depth of water inside the bay for any commerce that might come to Newport for some years to come, and any improvement of the bay should be made with a view to deepening the channel at the entrance. In my opinion this channel could only be made stable by the construction of at least one and more probably two jetties built out to deep water, and by dredging to obtain and maintain the required depth. In 1888 Major Benyaurd estimated that to obtain 8 feet at mean low water on the bar would require two jetties 3,000 and 2,200 feet long, respectively. He further estimated that 530,000 tons of stone would be required to construct the jetties; 450,000 tons at an estimated cost of $2 per ton and 80,000 tons at $4 per ton, a total cost, including about 25 per cent for contingencies, of $1,520,000. It is thought, however, that jetties could be built now at much less cost.

Newport is the natural seaport for Orange County, one of the most productive counties of the State. Its population is about 32,000 and is keeping pace with all of southern California in its rapid growth. The Santa Ana Chamber of Commerce states that the exports from Orange County are as follows: Two thousand four hundred cars of oranges, 350 cars of lemons, 3,000 cars of celery, 625 cars of walnuts.

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900 tons of chili peppers, 200,000 sacks of barley, 175,000 sacks of beans, 175,000 barrels of oil, 400,000 pounds of peanuts, 500 tons of dried apricots, 200,000 tons of hay, as also large quantities of poultry, eggs, honey, and dairy products. I have been unable to verify all of the above figures. These exports, however, are carried entirely by railroad. The fruit, celery, and walnuts are mostly shipped by rail to the East, but could be carried by vessels if traffic arrangements were made via the Tehauntepec Railroad, recently opened, and later by the Panama Canal. Newport is accessible as a port to San Bernardino, Riverside, and the northern part of San Diego counties, Arizona, New Mexico, southern Nevada, and southern Utah. This same territory is also tributary to the ports of San Pedro, Redondo, and Santa Monica, and these ports are at present favored by the railroads and get much of the commerce that might otherwise go to Newport. I am informed by the Newport Chamber of Commerce that—

for the year ending December 31, 1893, there were unloaded at the outside wharf for shipment over the Santa Fe Railway alone, 67 cargoes of lumber, the largest of which consisted of 750,000 feet of lumber, and 142 cargoes of merchandise, the merchandise vessels carrying passengers to this port, besides unloading from 5 to 9 cargoes of merchandise. This traffic was maintained until 1899 when trouble arose between railroad interests after the purchase of the wharf and short line by one of the roads interested in this port as a distributing point for the interior. In the year 1898 there was unloaded at this wharf for one railroad alone, 900 carloads of ties and 169 carloads of car material. Merchandise vessels invariably carried full cargoes from this port in exchange for cargoes delivered and the records show that the largest boat load of barley, consisting of 26,000 sacks, that ever entered Golden Gate, was loaded upon the steamship *Alki* at this port.

The ocean commerce of Newport has greatly decreased until at present it consists wholly of occasional cargoes of lumber. The freight received during the year amounted to 4,643,666 feet of lumber, having a value of $116,092. I give below commercial statistics for Newport for the year 1906 furnished by the Commercial Wharf at Newport. There were no shipments out of Newport. All freight is handled over the ocean wharf. There are reports of recent discoveries of crude oil in the vicinity of Newport. If oil in abundance is developed it is probable that the commerce will be greatly augmented in the next few years by the shipment of oil.

In view of the above facts I am of the opinion that Newport Bay is not worthy of improvement by the General Government at this time.

I forward herewith communications[a] relative to the improvement of Newport Bay received in response to invitation from this office.

[a] Not printed.

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Commercial statistics for the year ending December 31, 1906.

	Incoming.		Outgoing.
Vessels:			
Steam	8		8
Sailing	10		10
Total	18		18
Tonnage	5,445		5,445
Draft, greatest.....feet..	18		18
	Amount.	Value.	
Lumber.....feet..	4,643,666	$116,091.65	

Very respectively, your obedient servant,

AMOS A. FRIES,
Captain, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., June 3, 1907.

Respectfully returned to the Chief of Engineers, United States Army.

The district officer submits within a report on preliminary examination of Newport Harbor, California, which is accompanied by a number of letters from interested parties. He also advised those interested that they might submit direct to the Board statements and arguments bearing upon the proposed improvement, but none have been received. After describing the physical and commercial conditions the district officer expresses the opinion that the harbor is not worthy of improvement by the United States at this time. The report of Major Benyaurd on preliminary examination and survey, quoted from extensively, gives a very good description of the harbor and the adjacent locality, and it is stated by the district officer that present conditions do not differ materially from those existing at the time of the survey then made, the map of which has been examined. The natural depth over the bar appears to be about 4 feet, with an available depth inside the bar to Newport Landing of about 7 feet.

At present there is scarcely any ocean commerce. The only freight of consequence is lumber, which is reported to amount to about 8,000 tons, valued at $116,092. The letters accompanying the report indicate a belief that the commercial benefits from this proposed improvement would extend over Orange County, San Bernardino County, and a part of Los Angeles and San Diego counties, it being stated that Newport Harbor is the natural outlet for this section of country. This harbor is located about 22 miles south of San Pedro and 80 miles north of San Diego, at each of which places a deep-water port is being developed by the United States at a total cost of several million dollars. The country mentioned, with the exception of a

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small portion immediately adjacent to Newport, is also tributary to one or the other of these harbors, and it does not seem reasonable to the Board to expect that the harbor of Newport would develop more than a small local commerce affecting a limited radius, for the reason that rail-shipped freight would naturally seek one of the deep harbors mentioned in preference to one of considerably less depth, even though a little closer.

The entrance channel is shifting constantly, and owing to physical conditions a channel could be maintained only by extensive permanent structures, probably aided by dredging. Moreover, it is not improbable that a channel may at some time break through the narrow spit above the entrance, in which event any work done at the present mouth would prove a total loss. The cost of the work necessary to produce an 8-foot channel was estimated in 1888 at $1,520,000, but the district officer states that the jetties could probably be built now at less cost. If the depth then proposed could be secured for one-half or even one-fourth the former estimate the sum involved would, in the opinion of the Board, be out of all reasonable proportion to the probable benefit to present and prospective commerce.

In view of the small existing commerce and the improbability of an extensive one developing, coupled with the large cost of any effective improvement, the Board concurs in the opinion of the district officer that Newport Harbor is not at this time worthy of improvement by the General Government.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 83.

ERIE HARBOR, PENNSYLVANIA.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF ERIE HARBOR, PENNSYLVANIA.

DECEMBER 5, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 4, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated June 27, 1907, together with copy of a report from Col. H. M. Adams, Corps of Engineers, dated May 4, 1907, of a preliminary examination of Erie Harbor, Pennsylvania, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully, ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, June 27, 1907.

SIR: Under authority conferred by section 3 of the river and harbor act of March 2, 1907, I have the honor to submit herewith, for transmission to the Public Printer, report of May 4, 1907, by Col. H. M. Adams, Corps of Engineers, on preliminary examination ordered by said act of Erie Harbor, Pennsylvania, with a view to obtaining a depth of 22 feet and protecting Presque Isle Peninsula.

This locality is being improved at the present time under a project which provides for the protection of Presque Isle Peninsula and securing a harbor basin and entrance channel 20 feet in depth at mean lake level. In the opinion of the district officer no further protection than that provided for in the present project is necessary at this time,

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but the harbor is worthy of improvement to the extent of obtaining the greater depth of 22 feet.

This report was referred for consideration and recommendation by the Board of Engineers for Rivers and Harbors, as required by law, and attention is respectfully invited to the Board's report of the 17th instant, also herewith.

The examination of the locality made by that Board and the public hearing held by it at Erie have developed the fact that the improvement required in this harbor is not so much to increase the depth in the inner harbor as to straighten the channel inside the jetties, and to dredge the entrance channel sufficiently to give the project depth, with due allowance for wave oscillation—that is, to admit vessels drawing 20 feet, even when the water is low and the sea is rough.

I believe that this work is proper and should be done, but I also believe that it can be carried out without any extension of the existing project and with any funds that Congress may provide for executing and maintaining that project.

I therefore concur with the Board in its view that no further survey or estimate of cost should be made at the present time.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF ERIE HARBOR, PENNSYLVANIA.

UNITED STATES ENGINEER OFFICE,
Buffalo, N. Y., May 4, 1907.

GENERAL: In compliance with instructions contained in letter of March 14, 1907, I have the honor to submit report in duplicate on preliminary examination of Erie Harbor, Pennsylvania, with a view to obtaining a depth of 22 feet and protecting Presque Isle Peninsula, provided for in the river and harbor act of March 2, 1907.

This is a natural harbor, protected by the sandy peninsula of Presque Isle, with an opening at the east end, where there is an entrance channel 20 feet deep at mean lake level and 300 feet wide between parallel piers.

The protection of Presque Isle Peninsula is of vital importance to Erie Harbor. The weak portions of the neck are the long, narrow part 3,000 feet in length at the western end, and a length of about 1,000 feet at a point 5,320 feet west of the waterworks intake pipe.

On December 9, 1889, the matter of the protection of Presque Isle Peninsula was referred to the Board of Engineers, consisting of Colonels Abbot and Comstock, and Lieutenant-Colonel Gillespie, and the report of the Board is printed on pages 2800–2804 of the Annual Report of the Chief of Engineers for 1890.

The following appears in the report of the Board:

> The citizens of Erie have long feared the final destruction of their harbor unless the peninsula was held and breaches prevented, and with small appropriations and consequently light works, protection has been tried on the lake side of the peninsula at various times for the last sixty years, with an aggregate expenditure of $200,000 or $300,000. One after one the works have gone away. In the opinion of the Board these fears are exaggerated, as the present rate of

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reduction of harbor area of 7 per cent in a hundred years is very small—much too small to justify a large expenditure to prevent it before its injurious effect is felt. There is little doubt that a continuous line of heavy dikes along the lake shore from the root of the peninsula for 11,000 feet to the northeast, if built strongly enough, would stop the recession of this part of the peninsula and prevent breaches for a hundred years to come. But Captain Mahan estimates the cost of only 6,000 feet of such work at about $360,000. Considering the slow rate at which the lake shore line has receded for the last twenty-two years—a rate which is itself diminishing if the survey of 1819 can be depended on—considering also the great expense which will necessarily attend an attempt to hold the lake shore line of the peninsula, the Board is of opinion that the attempt should not be made until its necessity is evident, a necessity which will probably not occur in fifty years, unless there is a great change in the rate of recession. Should a breach in the neck of the peninsula occur, it should at once be closed, so as to stop all flow of water through it, by a light dam of stone, or stone and brush, with earth, built in the shoal water of the harbor around its inner end, as was recommended by the last Board of Engineers on the subject in 1882. If it were closed before it had time to enlarge much, $20,000 would probably be ample, and this amount might well be held in reserve for the purpose. No further expenditure should be made at present to protect the neck of the peninsula on its lake side.

This recommendation was approved by the Chief of Engineers January 17, 1890, and $20,000 has since been held in reserve and is now available for the protection of the neck of Presque Isle Peninsula, under the project in force for improving Erie Harbor, and no further protection than that provided for in the project is considered necessary at the present time.

This opinion is based upon a careful consideration of the changes that have taken place at the neck of the peninsula since the recommendation of the Board was made and approved, in 1890. A map is herewith [a] showing the lake shore lines of the peninsula as determined by surveys made in 1875, 1888, 1896, and 1907, and also cross sections [a] of the neck as determined by the surveys of 1888, 1896, and 1907.

The rate of reduction of the harbor area of 7 per cent in a hundred years, as determined by the Board of 1890, is shown by the map not to have been realized during the past thirty-two years. In fact, there has been practically no reduction.

As shown by the recession of the lake shore line of the neck, erosion has there been positive, notably since 1896. It is well known that this notable erosion was started by the shore protection built in 1889. It has kept up ever since, is most severe during fall storms from the southwest, and was excessive during an unusual storm on January 20, 1907.

The neck has, however, withstood the erosive wave force and wash occurring during severe storms without being breached during the thirty-two years, 1875–1907, and now forms a barrier between the lake and harbor of a reasonably safe width and height, as shown by typical cross sections on the map.

The cross sections show that on the whole length of 11,000 feet of the neck the lake shore line has receded about 150 feet during the thirty-two years, 1875–1907, and the harbor shore line has advanced 40 to 100 feet. The cross-sectional area of the neck formation above mean lake level has, during the same period, been reduced; this

[a] Not printed.

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reduction at the two critical points, shown on cross sections, "Sta. 43" and "Sta. 102 + 50" being:

At Sta. 43, from 975 square feet to 412 square feet.

At Sta. 102 + 50, from 1,275 square feet to 610 square feet.

At these critical points the height of crest of beach has changed, viz:

At Sta. 43, reduced from 6 feet to 4.9 feet high above mean lake level.

At Sta. 102 + 50, reduced from 8.4 feet to 3 feet high above mean lake level.

During extreme storms, 1897–1907, the high-water levels were as follows:

September 12, 1900, 2.8 feet above mean lake level.

January 20, 1907, 3.2 feet above mean lake level.

It is known that much of the reduction of height of crest at Sta. 102 + 50 was caused by wave wash during the storm of January 20, 1907.

The "neck" beyond the lake weather beach is covered with a growth of trees and bushes. Prior to 1896 this growth consisted chiefly of poplar trees 50 feet or more apart, with bare spots between. In 1896–1898, 6,600 young locust and willow trees were planted along 3,000 linear feet of the long narrow part of the neck, and 1,000 linear feet of the narrow part adjoining the body of the peninsula. Most of these trees were planted in rows 10 feet apart; some were planted at random between the poplars. The trees have grown well, especially the locusts, in the sand forming the "neck."

Erosion during severe storms has destroyed some of this tree growth, the amount thus destroyed being estimated at 1,250 feet, or about 20 per cent, over an area 4,000 feet long and 30 to 40 feet wide.

The existing tree growth is of good size, the poplars being from 20 to 45 feet high, the willows from 15 to 20 feet high, and the locusts from 10 to 25 feet high. Most of these trees have branches down to the ground, which effectively arrest wind-blown sand.

There is practically no grass or weed growth on the "neck." In the vicinity of Sta. 102 + 50 the growth of bushes and small trees was washed out for a length of 200 feet by storm of January 20, 1907.

Quoting from the report of the Board of 1890, "All the surveys show that the lake shore line of the peninsula has in its western 4 miles been steadily receding since 1819, while to the east and southeast of this point (Presque Isle light-house) the shore line has as a rule been advancing into the lake, the maximum advance being about 1,500 feet."

The westerly 2 miles of the 4 miles of receding shore line mentioned comprises the neck of the peninsula, the remaining 2 miles, the body of the peninsula, northeasterly and easterly therefrom, to Presque Isle light.

As shown on the map herewith, the recession of shore line has continued, and now extends east of the Presque Isle light about 4,000 feet. Then accretion begins and extends for about 12,000 feet around the easterly end of the peninsula to the north pier.

The Board of 1890 did not consider the protection of the lake shore of the body of the peninsula as essential to the protection of Erie Harbor, as all of it was of ample extent to withstand wave force without being breached. The same conditions hold at the present time and no protection works are now needed to prevent breaching.

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Three jetties have, however, been built, as shown on the map herewith; not as protection against breaching, but with a view to arresting the accretion of sand at the easterly end of the peninsula and its consequent encroachment upon the entrance channel. A fourth jetty, that at the Presque Isle light, was built by the Light-House Establishment for the protection of that light, but may be considered as one of the series of four.

All have proved failures, as shown by the positive and undiminished accretion and encroachment at the north pier. In fact, the marked recession and accretion which has occurred since 1888 goes to prove that the jetties have increased both the erosive and accretive actions. Furthermore, the jetties have, in increasing erosive action, caused the destruction of considerable large tree growth along the shore line, 1,200 to 1,500 feet eastward from each. This destruction has amounted to 40 to 60 large trees and a large amount of undergrowth within the past three years.

In this connection attention is invited to a report of Maj. T. W. Symons, Corps of Engineers, "as to the feasibility and advisability of improving Erie Harbor by the construction of dikes to prevent the closing by sand of the harbor entrance," printed in the Annual Report of the Chief of Engineers for 1896, page 3101 *et seq.*, and to the report on survey of Erie Harbor, also by Major Symons, printed in House Document No. 70, Fifty-fifth Congress, first session, and in the Annual Report of the Chief of Engineers for 1897, page 3237 *et seq.*

In the latter report is found the following:

> An estimate is made herein for four jetties to be built out from the lake side of the peninsula as sand catches and to prevent the beach from cutting, and the approximate locations therefor are marked on the accompanying map. Not more than one of these jetties should be built in any one year, and its effects should be carefully studied before building another. By proceeding with great caution it is possible that the further erosion of the north beach and the transfer of materials to the eastern end of the peninsula may be lessened.

The construction of four jetties in conformity with the above conditions forms a part of the project now in force for the improvement of Erie Harbor (river and harbor act of March 3, 1899).

Two jetties have been built, one in 1900 and one in 1903, as shown on the accompanying map. As before stated, and as the map shows, they have proved to be more injurious than beneficial.

No work is now proposed for the protection of the body of the peninsula; and the protection of the entrance channel against sand accretions at the eastern end of the peninsula should be confined to the direct and positive plan of extending the north pier from time to time, as such extensions become necessary.

A harbor basin has been excavated along the city dock front, and last year it was extended easterly as far as the Pennsylvania ore dock, the most easterly of the commercial docks. This harbor basin has the same depth as the entrance channel, viz, 20 feet at mean lake level.

The commerce of Erie Harbor is large and increasing, the shipments consisting largely of anthracite and bituminous coal received from the Pennsylvania mines by rail and shipped to upper lake ports; the receipts consist largely of iron ore from upper lake ports, en route to eastern mills.

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The following are the commercial statistics for the calendar year 1906, as furnished by the collector of customs at Erie:

Total arrivals and departures:	
Number	2,579
Tonnage	4,477,764
Increase in tonnage over 1905	343,305
Receipts by lake—tons	3,214,368
Shipments by lake—do	1,270,837
Amount of revenue collected, lake	$2,770.75
Value of imports, lake	$81,207.00
Value of exports, lake	$357,830.00
Enrolled tonnage—gross tons	53,894

The following table gives the total arrivals and departures, with tonnage, for the past seven years:

Year.	Number.	Tonnage.	Year.	Number.	Tonnage.
1900	2,709	3,403,312	1904	1,996	2,890,321
1901	3,405	3,204,325	1905	2,632	4,134,459
1902	2,809	3,873,734	1906	2,579	4,477,764
1903	2,423	3,503,628			

The depth of water at Limekiln Crossing, in the Detroit River, limits to a large extent the draft of vessels trading between Lake Erie and upper lake ports. The project adopted by the river and harbor act of March 2, 1907, provides for a depth of 22 feet at this point, in accordance with plan "B," House Document No. 266, Fifty-ninth Congress, second session.

Considering the value and extent of its commerce, its value as a safe harbor of refuge, and the increased draft of vessels on the Great Lakes, it is believed that Erie Harbor, Pennsylvania, is worthy of improvement by the United States to the extent of deepening the existing harbor basin and entrance channel to 22 feet at mean lake level.

To summarize:

(*a*) The provision in the existing project for improving Erie Harbor, viz: That $20,000 be held in reserve for closing any breach that may occur in the neck of Presque Isle Peninsula is considered sufficient.

(*b*) No protection works on the body of Presque Isle Peninsula are considered necessary.

(*c*) Erie Harbor is considered worthy of improvement by the United States to the extent of deepening the entrance channel and harbor basin of the existing project to 22 feet at mean lake level.

A survey and estimate of cost of the work can be made by this office without allotment of funds for that purpose.

Very respectfully, your obedient servant,

H. M. ADAMS,
Colonel, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.

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[Second indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., June 17, 1907.

Respectfully returned to the Chief of Engineers, United States Army.

The improvement contemplated under the act of March 2, 1907, calling for the preliminary examination of Erie Harbor, Pennsylvania, is an increase in depth from 20 feet to 22 feet and the further protection of the peninsula. For the latter purpose $20,000 has been set aside and is held available for the repair of a possible breach in the neck of the peninsula.

The district officer sums up his report with the conclusion that the harbor is worthy of improvement by the United States to the extent of deepening the entrance channel and harbor basin to 22 feet, but that no further protection work on the body of the peninsula than that provided for under the present project is considered necessary.

The existing project for the improvement of this harbor adopted by the river and harbor act of March 3, 1899, provided for—

1. Repairs to existing structures.
2. Extension of north pier.
3. Extension of south pier.
4. Dredging entrance channel to 20 feet depth.
5. Dredging area at eastern end of bay to 20 feet depth.
6. Building four protection jetties along outer side of Presque Isle Peninsula.
7. Maintenance of entrance channel.

With funds appropriated for the prosecution of this project two protection jetties have been built and nearly all the work of pier extension and dredging has been done. It is believed that sufficient funds are now available for the completion of the project, except maintenance.

It appears that the work already done for the protection of the peninsula and for the prevention of accretions at its eastern end has not wholly realized expectations, although the danger of the peninsula being breached is not imminent and that the damaging effect of the drifting sand at the entrance channel can best be overcome by the extension of the north jetty when this becomes necessary, which is not the case at the present time.

With a view to securing additional information in regard to this harbor and its necessities, the Board held a public hearing at Erie on June 6, 1907, at which all interested persons were given an opportunity to be heard, and on the same date the harbor was inspected. A number of statements and arguments submitted orally and in writing have been given careful consideration. It appears that the improvement most desired is an increase in depth at the entrance, lakeward from the jetties, so that vessels of deep draft will not strike the bottom in time of high waves, and the widening and straightening of the dredged channel inside the jetties. It is claimed that large vessels have difficulty in navigating this inner channel, which is not in prolongation of the jetty channel, and, therefore, requires a change in direction, resulting frequently in vessels striking on the north side of the channel near the inner gas buoy No. 8. No special demands were made for an increase in depth in the inner harbor over that provided for by the existing project. The straightening of the chan-

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nel inside the jetties appears to be a matter of detail which can be provided for in connection with the prosecution and maintenance of the existing project, and the Board is of the opinion that the maintenance of the full projected depth and width of channels through the jetties and at the entrance thereto will in a great measure overcome the difficulties complained of by navigation.

The large and increasing commerce of this harbor, amounting now in receipts and shipments to nearly 4,000,000 tons annually, is of sufficient importance, in the opinion of the Board, to warrant any reasonable improvement necessary for its benefit. With the completion of the present project and provision for its maintenance, however, this harbor will have the same depth as now projected for the ship channel connecting the waters of the Great Lakes between Chicago, Duluth, and Buffalo.

It is true that Congress has adopted a project for an auxiliary channel 22 feet in depth at Limekiln Crossing, in the Detroit River, but this is only a part of the through channel connecting the Great Lakes, and there were special reasons for this extra depth, which were given by the district officer in his report on the survey, and in its review of said report the Board of Engineers for Rivers and Harbors agreed with the district officer that for reasons stated the depth should be 22 feet. It seems proper to state in this connection that in the same report the general project for a 22-foot and 25-foot depth in the Great Lakes was unfavorably reported upon.

Vessels can now be built of practically a uniform draft, with the expectation of their being used at any of the first-class ports, and, in the opinion of the Board, the present harmony existing between draft of vessels and depth in the principal harbors and in the main ship channel is very desirable and should be maintained. An increased depth at the principal harbors would naturally follow the deepening of the main ship channels connecting the Great Lakes throughout, but until the general subject of such increased depth, both in the main channels and other harbors of the first class, has been carefully considered and decided upon and a comprehensive plan adopted the Board believes it inadvisable to provide a greater depth at Erie Harbor.

In conclusion, the Board agrees with the district officer that further work for the purpose of protecting the peninsula or arresting the drift of sand beyond what may be done with the $20,000 available in case of emergency is not necessary or advisable at this time, but it can not concur with him in recommending at this time an increase in depth in Erie Harbor to 22 feet.

For the Board:

D. W. Lockwood,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 216.

CHEAT RIVER, WEST VIRGINIA AND PENNSYLVANIA.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF CHEAT RIVER, WEST VIRGINIA AND PENNSYLVANIA.

DECEMBER 9, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 5, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated December 2, 1907, together with copy of a report from Maj. H. C. Newcomer, Corps of Engineers, dated October 7, 1907, of a preliminary examination of Cheat River, West Virginia, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 2, 1907.

SIR: I have the honor to submit herewith for transmission to Congress report of October 7, 1907, by Maj. H. C. Newcomer, Corps of Engineers, on preliminary examination authorized by the river and harbor act, approved March 2, 1907, of Cheat River, West Virginia, for a distance of 25 miles up from its mouth.

From the facts and for the reasons given, I concur in the opinion expressed by the district officer, the division engineer, and the

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Board of Engineers for Rivers and Harbors that this locality is not worthy of improvement by the General Government.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF CHEAT RIVER, WEST VIRGINIA AND PENNSYLVANIA, FOR A DISTANCE OF 25 MILES UP FROM ITS MOUTH.

ENGINEER OFFICE, UNITED STATES ARMY,
Pittsburg, Pa., October 7, 1907.

GENERAL: I have the honor to submit the following report of preliminary examination of "Cheat River, for a distance of twenty-five miles up from its mouth," as provided for by the river and harbor act of March 2, 1907.

Prior examinations are reported in the Annual Reports of the Chief of Engineers for 1889, page 1905, and 1904, page 2538, the former recommending removal of bowlders between Rowlesburg and the mouth at a cost of $13,000, which work was authorized by Congress and done, and the latter pronouncing the river unworthy of further improvement by the General Government.

The Cheat River is one of the principal tributaries of the Monongahela River. It has its extreme source in Pocahontas County, W. Va., and flows in a northerly direction through Randolph, Tucker, Preston, and Monongalia counties, crossing the Pennsylvania State line about 3.5 miles above its mouth at Point Marion. The drainage area is given as 1,375 square miles above a point about 10 miles from the mouth. The river has a total fall of about 3,200 feet in a length of about 140 miles. It appears from the records that for some distance above Rowlesburg the slope is sufficiently moderate to permit rafting, but from Rowlesburg down to Beaver Hole, which is about 16 miles from the mouth, the river is almost impassable by reason of steep slope and rocky bed and banks. The course of the river for the lower 25 miles and the rugged character of the adjacent country are shown on the topographic sheets of the Morgantown and Bruceton quadrangles, United States Geological Survey.

The slope averages about 6 feet per mile for 17 miles from the mouth, 15 feet per mile for the next 2 miles, and 28 feet per mile for the next 6 miles, thus giving a total fall of about 300 feet in the 25 miles. In 1899 a gauge station was established about 10 miles from the mouth by the United States Geological Survey, and gauge readings were taken and discharge measurements made at intervals for a number of years. Water Supply Paper, United States Geological Survey, No. 169, page 39, reports the gauge readings for the year 1905, and gives references to preceding papers in which this station was reported. The minimum discharge reported is 190 cubic feet per second, and the maximum, 7,270 cubic feet per second.

In response to circular letters requesting information as to the benefits to be expected from the proposed improvement, several were received advocating the work as a means of providing the extensive mineral deposits along the river, while one

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party familiar with the locality expressed the opinion that any money expended on the river would be absolutely thrown away. This region is said to be particularly rich in coal and limestone. The coal map of the West Virginia geological survey does not show any coal in the immediate vicinity of the river for about 12 miles from its mouth, but from that point to Rowlesburg its course lies through the coal area of the Allegheny series. There is also a small area of Pittsburg coal between the Cheat and Monongahela rivers. There is a coal mine in operation at Cheat Haven, Pa., near the State line, but there are practically no other industries in operation at present on this portion of the river. It is claimed that the industrial development of this region would become possible with an improved river and would lead to the production and shipment of large quantities of coal, coke, limestone, cement, and building stones. It may be well to note in this connection that railroad surveys have been made on both sides of the river from Point Marion to Rowlesburg.

The only possible method of improving the river for steamboat and barge navigation would be by canalization. Such improvement might be practicable, though the expense would be very great, and I am not aware of any stream of like physical conditions where it has been attempted. With a lift of 12 feet for each lock and dam, it would require 25 locks and dams for the 25 miles under consideration. Moreover, navigation would probably be quite hazardous in any case on account of the sudden floods to which the river is subject by reason of its very steep slope.

It is not thought that the commercial benefits would be commensurate with the great cost of improvement, and I have, therefore, to report that, in my opinion, this locality is not worthy of improvement by the General Government.

Very respectfully, your obedient servant,

H. C. NEWCOMER,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

ENGINEER OFFICE, U. S. ARMY, CENTRAL DIVISION,
Detroit, Mich., October 16, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army, concurring in the views and opinion of the district engineer.

G. J. LYDECKER,
Colonel, Corps of Engineers,
Division Engineer, Central Division.

[Fifth indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., November 18, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

Cheat River is one of the principal tributaries of the Monongahela River. It drains a territory rich in timber and mineral resources, which are as yet practically undeveloped. In accordance

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with a project adopted in 1890, the sum of $13,000 was expended in removing rock obstructions, with a view to creating a channel navigable by loose logs from Rowlesburg to the mouth of the river, a distance of 30 miles. Although this improvement was of a permanent nature, it has had little or no effect on the development of the class of commerce for which it was intended.

The act of June 13, 1902, provided for a preliminary examination of Cheat River, and in conformity with law the report of the district officer thereon was reviewed by this Board. In view of the fact that the work formerly done in aid of log navigation had not afforded benefits commensurate with its cost, the Board expressed the opinion that it was not advisable to undertake further work with that object in view. With reference to the improvement of the stream for general navigation, the Board made the following statement:

> To improve the stream for navigation by boats would be very costly. Even in the lower 10 miles, which is the portion of the stream which would lend itself most readily to improvement, the slope is such that the only practicable means of improvement would be locks and dams. The cost of such work would be wholly out of proportion to the probable benefits.

In the within report the district officer states that the canalization of the river over the 25 miles considered in the present investigation would require 25 locks and dams, each having a lift of 12 feet. While, as stated above, this country is rich in mineral resources, it is clear to the Board that the benefits which would result from the improvement of so short a stretch of river where there is but little industrial development would not be commensurate with the enormous cost of such an improvement. In view of this fact the Board is of the opinion that it is not advisable for the United States to undertake the improvement of " Cheat River, for a distance of twenty-five miles up from its mouth."

Although interested parties were invited by the district officer to submit statements to the Board in regard to the necessity for the improvement of the portion of the river specified in the act, no response has been received.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 217.

BIG SANDY RIVER, TENNESSEE.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF BIG SANDY RIVER, TENNESSEE.

DECEMBER 9, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 5, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated December 3, 1907, together with copy of a report from Maj. William W. Harts, Corps of Engineers, dated October 26, 1907, of a preliminary examination of Big Sandy River, Tennessee, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 3, 1907.

SIR: I have the honor to submit herewith for transmission to Congress report of October 26, 1907, by Maj. William W. Harts, Corps of Engineers, on preliminary examination of Big Sandy River, Tennessee, authorized by the river and harbor act approved March 2, 1907.

From the facts and for the reasons given, I concur in the opinion expressed by the local officer, the division engineer, and the Board of Engineers for Rivers and Harbors that Big Sandy River, Tennessee,

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is not worthy of improvement by the Federal Government at the present time.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF BIG SANDY RIVER, TENNESSEE.

ENGINEER OFFICE, UNITED STATES ARMY,
Nashville, Tenn., October 26, 1907.

GENERAL: In accordance with the instructions of your letter of March 14, 1907, I have the honor to submit the following preliminary report on Big Sandy River, Tennessee, as required by the provisions of the act of Congress of March 2, 1907. The Big Sandy River was inspected by me at several places in October, 1907.

Location and description.—The Big Sandy River is a small stream, rising in Henderson County, Tenn., and flowing northeasterly into the Tennessee River near the town of Bayne, about 66 miles above Paducah. Its length is estimated to be about 150 miles, and its fall from the railroad bridge at Westport to its mouth is 115 feet, as obtained from elevations furnished by the railroad company. Its average fall is probably considerably less than 1 foot per mile in the lower reaches. Its low-water discharge is estimated to vary from 100 to 150 cubic feet per second, and the area of its drainage basin has been estimated to be about 550 square miles. Its width is variable, being about 30 to 100 feet. It consists of a succession of pools, separated by occasional shoals of rock or gravel, although shoals are often formed by collections of snags and drift. The fall in the river is largely concentrated at these obstructions. The river is blocked in many places with quantities of snags and overhanging trees, so that when examined in 1905 it was necessary to remove the skiff entirely from the river to pass several obstructions. This condition still exists. In addition to the snags and bars, there are five fish-trap dams and five bridges over the river, three of which are railroad bridges.

Former examinations.—A preliminary examination of Big Sandy River was made in October, 1905, and report submitted by Maj. H. C. Newcomer, Corps of Engineers, who reported as follows:

> Having in view the quite limited area to be affected by the improvement of such a considerable length of river, the comparative proximity of much of this area to the Tennessee River, the precarious nature, at the best, of navigation on this class of streams, and the grave uncertainty as to resulting benefits, I am of the opinion that the Big Sandy River from the mouth to Big Sandy is not worthy of improvement by the General Government.

This was concurred in by the division engineer and the Chief of Engineers. The Board of Engineers for Rivers and Harbors stated that "this prospective commerce is not sufficient to justify the probable cost of adequate improvement." (House Doc. No. 153, 59th Cong., 1st sess.)

Counties affected.—The Big Sandy River rises in Henderson County, flows successively through Henderson and Carroll counties, and is the dividing line between Henry and Benton counties in its

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lower portion. The population of these counties, as given by the census report of 1900, is as follows:

County.	Area, square miles.	Population.	Average density of population per square mile.
Henderson	515	18,117	35.1
Carroll	624	24,250	38.8
Benton	430	11,848	27.6
Henry	625	24,208	38.7

The density of population of New York in 1900 was 152.6; of Pennsylvania, 140.1; of Tennessee, 48.4.

The total assessed wealth, including real, personal, and other property, was as follows:

County.	Wealth.	Wealth per capita.
Henderson	$1,640,424	$90.00
Carroll	4,036,934	166.47
Benton	1,722,188	144.87
Henry	4,244,345	175.32

The per capita assessed wealth of the United States in 1900 was $448.33.

There is no town of any size anywhere on the river, Big Sandy being the largest, with a population of several hundred.

The country through which the Big Sandy River flows is still sparsely populated and comparatively undeveloped. Only the lower portion, where the river is affected by the backwater of the Tennessee River, has ever been used in any way for navigation within recent years, and in this region the country is swampy and generally heavily timbered in second-growth hard-wood trees. Nearly all the good timber was cut years ago.

Commerce.—Owing to the obstructions existing in this stream there is no navigation at present. Complaint has been made as to the exorbitant freight rates of the railroads, it being reported that competition has been stifled and high railroad rates maintained by purchasing the river boats. It is a well-known fact that no boats carry cotton, tobacco, or salt in any quantities in this region, the presumption being that it is through agreement with the railroad companies, as it is reported that there is not at present an independent boat on the Tennessee River.

The only use made of Big Sandy River during 1906, as near as can be ascertained by inquiries made of various shipping companies, was for floating 17,000 ties to the Tennessee River, valued at about $5,000.

The chief products of the region are tobacco, cotton, corn, and timber. The country adjacent to the river is flat, marshy, and heavily timbered.

Improvements practicable.—This stream is really only a narrow creek. The bends are numerous and sharp. The banks are low, having an average height above low water of about 8 feet in the lower reaches. Owing to these facts and to the limited discharge, any slack-water system of improvement would be impracticable. If the bars, many of which have apparently been formed by collections

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of snags, should be removed it would permit the water in the upper reaches to flow down more readily, thus lowering the levels in the upper portions and decreasing the available depths. In my opinion the only improvement of this river that would be of any practical value would be the removal of snags in the portions affected by the backwater of the Tennessee as far up as the Henry County bridge. The amount of commerce, however, that would use an improved river is indeterminate, and in view of the local conditions would undoubtedly be slight and out of all proportion to the cost of the work involved. Past experience in improving other similar tributary streams in this vicinity with the hope of stimulating river traffic has not been encouraging.

Recommendation.—In view of the foregoing, I give it as my opinion that the Big Sandy River is not worthy of improvement by the Federal Government at the present time.

Very respectfully,

WM. W. HARTS,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

OFFICE DIVISION ENGINEER, GULF DIVISION,
New Orleans, La., October 31, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army, concurring in the recommendation of the district engineer as given within.

E. H. RUFFNER,
Colonel, Corps of Engineers,
Division Engineer.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., November 18, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

Big Sandy River is a tributary of the Tennessee River, which it enters near the town of Bayne, Tenn. Its length is about 150 miles and its width varies from 30 to 100 feet. The territory which it drains is estimated to be about 550 square miles, and this country is sparsely populated and comparatively undeveloped.

The stream is a succession of pools separated by rock and gravel shoals or by accumulations of snags and drift. In its present condition navigation on the stream is necessarily limited to its lower portion, which is affected by the backwater of the Tennessee River. There is therefore no commerce upon the river, and as far as can be ascertained the only use made of it during 1906 was for floating to the Tennessee River 17,000 ties, valued at about $5,000.

The only preliminary examination of Big Sandy River heretofore made by the General Government was ordered by the act of March 3, 1905, and the report thereon was reviewed by the Board of Engineers for Rivers and Harbors in conformity with law. As a result of the investigation then made, the Board reached the conclusion

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that if the river were improved the commerce would consist principally in timber cut from the adjacent country and a small amount of merchandise, this prospective commerce being insufficient to justify the cost of an adequate improvement. At that time the Board endeavored to secure statements from interested parties as to the necessity for the improvement of the river, but the invitation of the district officer having this object in view met with no response, nor has the Board in the present instance received any communications from those who were invited by the district officer to submit statements and arguments in behalf of the work.

In view of the local conditions, which make it evident that only a small commerce would result from a comparatively expensive improvement, the Board concurs with the district officer and the division engineer in the opinion that it is not advisable for the United States to undertake the improvement of Big Sandy River, Tennessee, at the present time.

For the Board:

R. L. Hoxie,
Colonel, Corps of Engineers,
Senior Member Present.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 218.

USE OF SURPLUS WATER FLOWING OVER GOVERNMENT DAMS IN MISSISSIPPI RIVER BETWEEN ST. PAUL AND MINNEAPOLIS, MINN.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT AS TO USE OF SURPLUS WATER FLOWING OVER GOVERNMENT DAMS IN THE MISSISSIPPI RIVER BETWEEN ST. PAUL AND MINNEAPOLIS.

DECEMBER 9, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed with accompanying illustration.

WAR DEPARTMENT,
Washington, December 5, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated 3d instant, together with copy of a report by a commission, dated September 26, 1907, concerning the use of the surplus water not needed for navigation flowing over the Government dams under construction in the Mississippi River between St. Paul and Minneapolis, Minn., made in compliance with the provisions of an act of Congress approved June 25, 1906.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 3, 1907.

SIR: I have the honor to forward herewith for transmission to Congress a report dated September 26, 1907, by a commission authorized by act approved June 25, 1906, entitled as follows:

An Act To provide for a commission to examine and report concerning the use by the United States of the waters of the Mississippi River flowing over the dams between Saint Paul and Minneapolis, Minnesota.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

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REPORT OF A COMMISSION CONCERNING THE USE OF THE SURPLUS WATER NOT NEEDED FOR NAVIGATION FLOWING OVER THE GOVERNMENT DAMS UNDER CONSTRUCTION IN MISSISSIPPI RIVER BETWEEN ST. PAUL AND MINNEAPOLIS, MINN.

ST. PAUL, MINN., *September 26, 1907.*

Mr. SECRETARY: The Commission appointed in pursuance of an act of Congress approved June 25, 1906—

to examine and report to the Secretary of War, for transmission to Congress, concerning the use of the surplus water which shall not be needed for the purposes of navigation flowing over the dams now under construction by the United States in the Mississippi River between the cities of Saint Paul and Minneapolis, Minnesota—

has the honor to submit the following report:

The Commission convened in St. Paul, Minn., on March 28, 1907.

The physical data available in the United States Engineer Office were studied, and examination was made of the sites of the dams.

By appointment, representatives of the various interests in and about St. Paul which have developed or which now utilize water power, or power of any kind in large quantities, met the Commission, and discussion resulted as to the possibility of developing and utilizing or marketing power at either of the United States dams.

Having prepared a list of data required and having made arrangements through the courtesy of the United States Engineer Office at St. Paul to obtain the same, the Commission adjourned to meet at the call of the senior member.

The Commission again met at St. Paul, Minn., on September 26, 1907.

Having considered the additional data that had been collected and discussed the matter before it from every point of view, the Commission proceeded to formulate this report, after which it adjourned sine die.

The terms of the act governing the work of the Commission are as follows:

SEC. 2. That this commission shall examine and report upon the following propositions:

First. Whether there will be any surplus water flowing over said dams not needed for the purposes of navigation which might be available for mechanical or commercial power.

Second. Whether such power, or any part thereof, could be economically utilized for furnishing the light and power now needed or which hereafter may be needed in the buildings and property of the United States at Saint Paul, Minneapolis, and Fort Snelling, Minnesota, and, if so, to what extent, and what proapolis, and Fort Snelling, Minnesota, and, if so, to what egtent, and what proportion or amount of the available power could be so utilized by the United States or disposed of in any manner to the advantage of the United States.

Third. If it shall appear to said commission feasible and economical for the United States to use or dispose of such power or any part thereof, then said commission shall report a plan or plans, with terms and conditions for such use or disposition, and an estimate of the cost thereof to the United States.

SEC. 3. That the said commission shall meet at such time and place as may be directed by the Secretary of War, and shall transmit said report within two years after the passage of this Act.

With a view to improving the Mississippi River for purposes of navigation between St. Paul and Minneapolis, Minn., the United States has completed a lock and dam, known as Lock and Dam No. 2, a point 2.18 miles below the Washington Avenue Bridge, in the

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city of Minneapolis. A second lock and dam, known as Lock and Dam No. 1, are under construction at a point 2.88 miles farther downstream. It is the dams above mentioned which are referred to in the act creating this Commission.

The river at both dam sites flows between bluffs from 80 to 110 feet high and extends practically from bluff to bluff. The bed of the stream consists of a soft sand rock occasionally overlaid by clay, sand, gravel and bowlders. The sand rock is of a peculiar formation—soft, friable, porous, readily eroded, and seamy. It is practically without tensile strength, but its compressive strength when confined or in large masses is great.

The flow of the Mississippi is practically the same at each of the two dams, ranging from less than 2,000 to more than 55,000 cubic feet per second.

At a cost exceeding $1,500,000 the United States has constructed and now operates upon the upper Mississippi River a system of five reservoirs of a combined capacity of 93,237,100,000 cubic feet. The watersheds of these reservoirs constitute 21.5 per cent of the total watershed above Minneapolis. These reservoirs are operated with a view to maintaining a 3-foot stage at St. Paul during the season of navigation.

The reservoirs have never, until within the last two years, been in a state of complete efficiency and amply provided with storage water.

There is every reason to believe that the United States will continue to maintain the reservoirs in a state of efficiency, and as an incident to maintaining 3 feet on the gauge at St. Paul will insure a minimum flow at Dams Nos. 1 and 2 of 5,000 cubic feet per second from March 20 to December 20. This is a conservative estimate, as the flow during the period mentioned will very rarely fall below 6,000 cubic feet per second.

During the ice period the minimum flow may be expected to descend to 1,200 cubic feet per second. This low record, however, has not been reached during the past seven years.

If Lock and Dam No. 1 be built as planned, with a guard of 11.9 feet and no sluices, the gross head will vary from 10.2 feet at 5,000 discharge to about 4 feet at high stages; and the duration of the low heads will be prolonged, due to backwater from the Minnesota River.

Consideration of the low heads that will be available at Dam No. 1, and of the disadvantages pertaining to its site, makes it readily apparent to the Commission that no power can be economically developed at Dam No. 1; certainly not for many years after its completion, nor until the value of power in its vicinity has increased very largely beyond that now obtaining. The real problem before the Commission, therefore, is to determine what power, if any, can be economically developed at Dam No. 2.

At a discharge of 5,000 cubic feet per second the gross head at Dam No. 2, after Dam No. 1 has been constructed, will be 12.2 feet. While the discharge curve increases to 34,000 cubic feet per second, the gross head decreases to 10.6 feet. At 36,000 discharge the gross head is 9.1 feet, it becoming necessary to sluice water to avoid drowning out the lock walls. At 46,000 discharge both sluices must be opened, thus reducing the gross head to 7.8 feet, from which it decreases to about 7.4 feet by the time the maximum discharge is reached.

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The guard of the lock (i. e. the distance measured vertically between the crest of the dam and the top of the lock walls), is 8.25 feet. Flashboards may, therefore, be used at low stages to increase the head and to obtain a very limited storage above the crest of the dam. At higher stages, when the head is reduced, flashboards could not be used, lest the lock walls be drowned out.

Conditions adverse to power development, but necessarily imposed to guard the permanent interest of navigation, are as follows:

First. The water must never be drawn below the crest of the dam during the season of navigation.

Second. Water must be reserved during the navigation season for the operation of the lock. If the privileges of small pleasure launches be suitably restricted, there will probably not be required more than 50 cubic feet per second for this purpose.

Third. The lock is situated on the left bank of the river, adjacent to the shore. There must be no currents created near either end of the lock which would be detrimental to navigation.

Fourth. There must be no work done that will endanger the stability of any of the existing structures.

Fifth. The capacity of the sluices and dam crest to discharge water in time of flood must not be restricted without due compensation, lest the lock be drowned out.

Careful consideration of the conditions above stated convinces the Commission that if a power development at Dam No. 2 is practicable at all, the requisite space for the same must be found between the sluices and the right bank of the river. Attention is invited to accompanying sketch, upon which is shown the location of the sluices with reference to the bluff.

If attempt were made to utilize the entire 5,000 cubic feet per second that will be available during the season of navigation, a canal 250 feet wide and 7 feet deep would be required to allow of the proper setting of the turbines and to reduce the velocity of approach thereto to permissible limits. The tailrace would require an equal sectional area. Inspection of the sketch readily indicates the enormous excavation from the bluff that would be required to prepare the necessary waterways.

In the case of the tailrace the excavation would have to be carried to a depth of from 19 to 20 feet below the crest of the dam, and an excavation of this character in the soft and seamy sand rock would be a hazardous undertaking, in view of the head maintained so short a distance above.

In view of the great amount of excavation that would be required, the probable necessity of an enormous retaining wall, and the hazardous nature of the whole undertaking, the Commission is of the opinion that no development of the kind is practicable or advisable at the present time or until the value of power in the locality of the dam has considerably increased.

An alternative plan for a development that would utilize the flow of 5,000 cubic feet per second has also received attention. According to this plan an additional sluice would be constructed on the river side of the present sluices, and the power house would be located on the [illegible] of the present dam, adjoining the proposed new sluice, and extending to within about 250 feet of the river wall of the lock. A long [illegible] dam would be required to separate sluice and tail-water.

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Such development could probably be made within reasonable limits of cost, with good luck and if no unforseen accidents occurred. But the Commission hesitates to recommend this plan by reason of the risks that would be run in excavating and maintaining the tailrace in the soft sand rock along the lower side of the power house for a width of more than 200 feet, measured perpendicularly to the current.

There remains for consideration a small development, say of 1,300 horsepower, corresponding to the minimum flow of the river in winter.

Such development could best be made at the side of the river opposite the lock.

For such a power a canal and a tailrace each 70 feet wide and 7 feet deep would suffice. The excavation into the bluff would not be excessive, and the cost of the retaining wall would be much reduced, as would also any risk due to excavation of tailrace, such as was alluded to when discussing the larger development in this same location.

Thirteen hundred horsepower developed at the dynamos would much more than provide for lighting the Government buildings at St. Paul, Minneapolis, and Fort Snelling, and for supplying the limited number of small motors that will probably be installed therein, even if large allowance be made for future increases. The surplus of power developed might be so disposed of as to offset line charges and maintenance of service from other plants during the breakdowns that must be anticipated.

The cost of the development of 1,300 electric horsepower in the manner above described is estimated by the Commission at $160,000.

The cost of maintenance and operation, not counting beyond the dynamos, would be about $4,000 per annum. The fixed charges would include $4,800 for interest and $9,600 for deterioration, making a total annual operating cost of $18,400.

The consumption of electric power at United States buildings in St. Paul and Minneapolis, Minn., and vicinity for the fiscal year ending June 30, 1907, is shown in the following table:

Building.	Kilowatts.	Cost.
Court-house and post-office, St. Paul	114,072	$5,133.23
Custom-house, St. Paul	8,599	386.95
Court-house and post-office, Minneapolis	70,715	3,889.33
Fort Snelling	309,300	10,631.72
Total	502,686	20,041.23

Allowing for line and other losses incident to the generation and transformation of electric current, the above consumption corresponds to an average of 175 to 200 horsepower, with a maximum demand of about 600 horsepower at the water wheel.

From the foregoing figures it is evident that a probable saving of less than $2,000 would result from the 1,300 horsepower development.

To offset this probable saving are the risks to the present works, necessarily incident to new work in the soft and seamy rock that constitutes the bed and banks of the river.

If it should assume that no radical steps will be taken in the future to develop, in a comprehensive and economical way, the entire power

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available in the Mississippi River between Minneapolis and St. Paul, this Commission might give further consideration to a development of 1,300 horsepower at Dam No. 2; but in view of all the circumstances, and having in mind what the future may bring forth, the Commission is constrained to recommend that no power development whatever be attempted at the present time either at Dam No. 2 or Dam No. 1.

The value of water power converted into electric units and disposed of in any community such as that comprised in and about St. Paul and Minneapolis is rapidly increasing, due to the increase of population and of industry and the increased cost of coal. Many projects that are not now feasible may be expected to become so with the lapse of time. It appears reasonable to the Commission to believe that within twenty or twenty-five years, and perhaps within a much shorter period, it will be economically desirable that there be erected a high dam at the lowest suitable point between St. Paul and the site of Dam No. 1, the backwater from which would extend to the lower tailrace at Minneapolis. In this way there could be obtained a head of probably 35 feet at lower stages, and it would be practicable to develop from 15,000 to 20,000 horsepower.

Such a dam would drown out Locks and Dams Nos. 1 and 2 and any works appurtenant thereto. In connection with such a dam there would be required a single high lift lock to care for navigation.

Any small power development now undertaken at either of the existing dam sites would be destroyed if the comprehensive development were made. Thus, any small development made at the present time would be obstructive and stand in the way of what the Commission believes may be the final solution of the problem.

The act creating this Commission did not provide funds with which to obtain data or prepare extensive plans relating to the comprehensive development above alluded to. It is probable that by the time such a development becomes economically advisable private individuals or corporations will approach the United States, submitting plans and requesting the permission of Congress for their execution. At that time consideration should be given to the conditions under which the work should be permitted to be done. Such conditions might well embrace the furnishing of such power as is needed for the lighting of Government buildings and reservations in the neighborhood, including the furnishing of power for motors thereat.

Very respectfully,

W. V. JUDSON,
Major, Corps of Engineers, U. S. A.
J. E. WOODWELL,
Inspector Electric Lighting Plants, Treasury Department.
AMOS W. KIMBALL,
Major, Quartermaster, U. S. Army.

The Honorable the SECRETARY OF WAR.
(Through the Chief of Engineers, U. S. A.)

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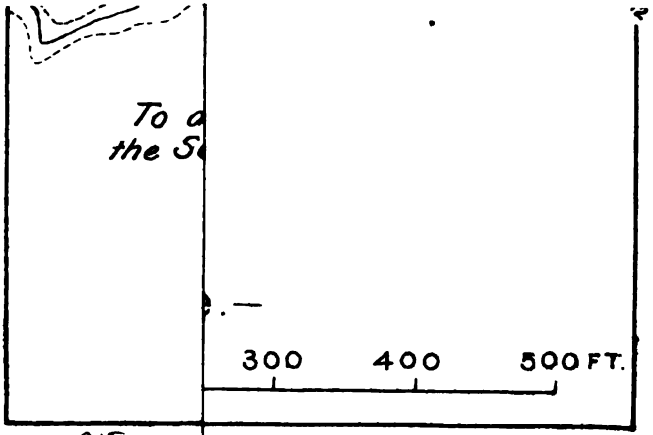

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 219.

BOYCE LANDING, RED RIVER, LOUISIANA.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF BOYCE LANDING, RED RIVER, LOUISIANA.

DECEMBER 9, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 5, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated December 3, 1907, together with copy of a report from Capt. G. M. Hoffman, Corps of Engineers, dated October 29, 1907, of a preliminary examination of Boyce Landing, Red River, Louisiana, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 3, 1907.

SIR: I have the honor to submit herewith, for transmission to Congress, report of October 29, 1907, by Capt. G. M. Hoffman, Corps of Engineers, on preliminary examination authorized by the river and harbor act approved March 2, 1907, of Boyce Landing, on the Red River, Louisiana, with a view to ascertaining whether any improvements are required in the interest of navigation.

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From the facts and for the reasons given, I concur in the opinion expressed by the district officer, the division engineer, and the Board of Engineers for River and Harbors that this harbor is not worthy of improvement by the General Government, no improvements being required in the interest of navigation.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF BOYCE LANDING, RED RIVER, LOUISIANA.

UNITED STATES ENGINEER OFFICE,
Vicksburg, Miss., October 29, 1907.

GENERAL: In accordance with instructions contained in your letter of March 14, 1907, I have the honor to report on a preliminary examination of Boyce Landing, on the Red River, with a view of ascertaining whether any improvements are required in the interests of navigation.

The town of Boyce is in Rapides Parish, La., and has a population of about 1,000. It is situated in a bend of Red River where the bank is slowly receding, thus threatening valuable town property with eventual destruction. Deep water along the town front and a sand bar above afford more favorable conditions for the landing of boats than usually obtain along Red River, so that the benefit which would accrue from the only improvement needed, i. e., the revetment of the caving bank, would be merely the protection of town property.

A map[a] is herewith, showing the conditions in this locality in 1890; the present shore line is indicated, showing a recession of about 150 feet in seventeen years.

In my opinion this harbor is not worthy of improvement by the General Government, no improvements being required in the interests of navigation.

Respectfully submitted.

G. M. HOFFMAN,
Captain, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

OFFICE DIVISION ENGINEER, GULF DIVISION,
New Orleans, La., October 31, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army, concurring in the recommendation of the district engineer, as given within.

E. H. RUFFNER,
Colonel, Corps of Engineers,
Division Engineer.

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[a] Not printed.

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[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., November 18, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

The preliminary examination of Boyce Landing, on the Red River, reported upon within, was ordered with a view of ascertaining whether any improvements are required at that point in the interests of navigation. The town of Boyce is situated in a bend of Red River where conditions for the landing of boats are better than usually obtain along that stream. The improvement desired is stated by the district officer to be the revetment of the caving bank, which threatens valuable town property with eventual destruction, and the Board has received a petition from interested parties favoring such an improvement.

The Board recognizes the fact that the protection of the caving bank at Boyce would be of value to landed interests at the place, but available information indicates that no improvements are required at this locality in the interests of navigation, nor is any improvement with that object in view requested in the petition of local interests.

In view of the above, the Board concurs with the district officer and the division engineer in the opinion that Boyce Landing is not worthy of improvement by the United States.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 220.

CADDO LAKE, TEXAS AND LOUISIANA.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF CADDO LAKE, TEXAS AND LOUISIANA, WITH PLAN AND ESTIMATE OF COST OF IMPROVEMENT.

DECEMBER 9, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed with accompanying illustrations.

WAR DEPARTMENT,
Washington, December 5, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated 3d instant, together with copies of reports from Capt. W. P. Wooten, Corps of Engineers, dated July 27 and November 2, 1907, of a preliminary examination of Caddo Lake, Louisiana and Texas, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 3, 1907.

SIR: I have the honor to submit herewith for transmission to Congress reports of July 27, 1907, and November 2, 1907, by Capt. W. P. Wooten, Corps of Engineers, on preliminary examination, with plan and estimate of cost of improvement, authorized by the river and harbor act approved March 2, 1907, as follows:

Caddo Lake, with a view to determining advisability of constructing a dam at the foot of said lake on the waterway connecting Jefferson, Texas, with Shreveport, Louisiana.

The construction of a dam as proposed is estimated to cost $100,000, and I concur in the views of the district officer, the division engineer,

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and the Board of Engineers for Rivers and Harbors that this locality is worthy of improvement by the United States in the manner indicated.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF CADDO LAKE, TEXAS AND LOUISIANA (PART OF WATERWAY CONNECTING JEFFERSON, TEX., WITH SHREVEPORT, LA.), WITH A VIEW TO THE CONSTRUCTION OF A DAM AT THE FOOT THEREOF.

UNITED STATES ENGINEER OFFICE,
Dallas, Tex., July 27, 1907.

GENERAL: I have the honor to submit the following report of an examination of Caddo Lake made in pursuance of the following item of the river and harbor act of March 2, 1907:

That the Secretary of War is hereby directed to cause preliminary examinations or surveys to be made at the following localities: * * * Caddo Lake, with a view to determining advisability of constructing a dam at the foot of said lake on the waterway connecting Jefferson, Texas, with Shreveport, Louisiana.

Caddo Lake, called in previous reports Ferry (or Fairy) Lake, is a link in the waterway connecting Jefferson, Tex., with Shreveport, La., the chain, beginning at Jefferson, consisting of Cypress Bayou, Caddo Lake, Big and Little Willow passes, Soda Lake, Twelvemile Bayou, and Red River.

A complete survey of these waterways was made in 1890–1893 by Capt. J. H. Willard, Corps of Engineers, and his report was published in the Annual Report of the Chief of Engineers, 1893, p. 2065. An examination and resurvey of a portion of the waterways was made under this office in 1905, the report of which was published in House Document No. 785, Fifty-ninth Congress, first session. The metric system of measurements was adopted in these surveys and is therefore adhered to in this report.

The waterway from Jefferson, at the head of navigation of Cypress Bayou to the foot of Caddo Lake, is navigable the year round for light-draft boats, and with a little dredging could easily be made navigable for boats drawing 6 feet. The banks of the bayou are stable, the channel reasonably straight, and although somewhat obstructed by snags these are now being removed. The total low-water slope from Jefferson to the mouth of the bayou is about 0.6 meter, the distance being 38.5 kilometers. The channel through the lake is of good depth and will be plainly marked when the work now being done is completed. The waterway through Cypress Bayou and Caddo Lake, when placed in good navigable condition, can be maintained at that condition the year round at a cost not exceeding $5,000 annually.

After leaving Caddo Lake the waterway passes through Big and Little Willow passes, which have good depths, and spreads out into da Lake, which has no navigable depth except during very heavy s, which do not occur with sufficient frequency or regularity to ify any serious attempts at navigation. From Soda Lake the

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stream passes over the falls into Twelvemile Bayou, and thence into Red River. The falls are working their way upstream, and the lower part of Soda Lake has already been drained. After they have eaten through about 4 kilometers more they will have entered the passes, where the water is deep, and will at once begin on the foot of Caddo Lake, eventually draining that and destroying all navigation now existing between Jefferson and Mooringsport.

In the report of 1905 a project for a lock and dam at the foot of Caddo Lake, supplemented by extensive dredging, was advanced for the improvement of the waterway. It was proposed to dredge the channel from Red River to the foot of Caddo Lake, giving it a bottom elevation of 50.25 meters above the Cairo datum, giving a depth of 6 feet for eight months in the year, the surface elevation of the water being 52.1. At the foot of Caddo Lake a lock with fixed dam 950 meters long was proposed, giving an upper pool-surface elevation of 57. The purpose of the proposed lock and dam was not to create a navigable pool, but merely to preserve the pool already existing and prevent its being drained by the dredged channel below. At present during long-continued droughts evaporation is sometimes great enough to absorb all the flow and cause the falls to run dry. The construction of the lock and dam proposed will change conditions by shutting out Clear Lake, Shifttail Lake, and Soda Lake, thus greatly reducing the evaporation area. To offset the water thus saved there will be a loss by leakage and lockages. Inasmuch as the dam proposed is a fixed one of low elevation, the leakage through both lock and dam should not be in excess of 50 cubic feet per second.

The loss in lockage, assuming the lock to be 170 by 50 by 16 feet, is 136,000 cubic feet per lockage. Assuming 20 lockages per day, the amount lost is 32.6 cubic feet per second. The total loss through leakage and lockages would then be 82.6 cubic feet per second.

The low-water discharge of the Cypress Bayou at Jefferson is estimated at slightly less than 3 cubic meters, say 85 cubic feet per second. This discharge is just about sufficient to take care of the leakage and lockages, on the liberal basis of 20 lockages per day, neglecting the accession of water from other sources or the loss by evaporation. Assuming, then, that at low stages the inflow from Cypress Bayou is equal to the outflow through the lock and dam, we have only the drainage into the lake from other sources than the Cypress Bayou to supply the evaporation loss. Neglecting such sources entirely, assuming that the water stands just at the crest of the dam at the beginning of a dry season, and assuming the rate of evaporation at 0.33 of an inch per day (a liberal assumption, since a large part of the lake is shaded by cypress trees), there will be a reduction in level of 0.33 of an inch per day. In other words, if the pool was just able to take 6-foot navigation, at the end of two months' drought it could still accommodate boats drawing a little over 4 feet.

There would therefore seem to be no question that ample navigable depth would be maintained above the dam.

The conditions below the dam would depend upon Red River stages and the channel would be navigable at such times as Red River itself was navigable. The permanence of this condition is assured by the stability of the low-water surface of Red River at the mouth of Twelvemile Bayou, the changes due to the removal of the raft not having extended down the river to this point. The project in

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its entirety would provide as good navigable conditions to Jefferson as now obtain to Shreveport.

Of all projects for the improvement of the whole waterway this seems to be the most feasible, but it was not recommended when it was developed on account of its cost ($525,000), as the commerce to the points affected was not deemed great enough to justify the expense. However, it is claimed that by establishing a water rate to some town in northeastern Texas the freight rates of a large and populous portion of the State would be materially reduced. In fact, speaking of this improvement, Hon. O. B. Colquitt, a member of the railroad commission of the State of Texas, says:

> I assume that with the navigation of Cypress Bayou up to Jefferson that the same rates would apply to Jefferson that now apply to Shreveport, La. Estimating the benefits accordingly, I think that 20 per cent of the freight charges between the points named above would be saved to shippers, or a sum approximating $250,000 per annum would be saved to the people of that section of Texas. With navigation up to Jefferson I am of the opinion that the traffic passing through that place and on to the stations between those named on the Texas and Pacific would increase 20 per cent over the amount given in the figures above.
>
> I have not heard from the auditor of the Cotton Belt road, but think it safe to say that with the navigation of Cypress Bayou up to Jefferson, and with water rates applying to that point, the rates prescribed by the Texas railroad commission would base on Jefferson and all north Texas rates would be reduced from 10 to 33⅓ per cent on those which now apply to that section. In many cases the reductions would even be greater, and the saving, in my humble judgment, would easily equal one-half million per annum to the freight payers of north and northeast Texas.

Assuming that Mr. Colquitt's computations are correct, and assuming further that the improvement to be made on Sulphur River will give half the estimated benefits without any improvement of the Cypress, it would still appear as if this improvement would result in a saving of $250,000 a year to the inhabitants of northeast Texas. In that case the improvement would undoubtedly seem a worthy one, and it would be advisable to build a dam at the foot of Caddo Lake, provided it was built in connection with a lock and dredged channel as contemplated in the project submitted in House Document No. 785, Fifty-ninth Congress, first session.

The construction of a dam alone, with the necessary bank protection, etc., is estimated to cost about $100,000. Such a dam would cut off navigation to Shreveport, even in high stages, but as navigable periods are now so short and infrequent that they are of no commercial importance, no damage would be done by closing the route. It would be of benefit by preserving the water level, and, consequently, the navigable channel in Cypress Bayou and Caddo Lake between Jefferson, Tex., and Mooringsport, La. Without some protection this channel will eventually be ruined by the lowering of the water level when the falls have worked upstream to the pass. The construction of the dam, while permitting the falls to work upstream and drain Clear Lake and Shifttail Lake and complete the draining of Soda Lake, will stop them from advancing into Caddo Lake.

The question to be determined is whether the navigation between Jefferson and Mooringsport alone is worth the expenditure of $100,000 to preserve. Navigation between these two points had practically ceased until the past year, during which it has begun to revive.

...vival in the industries of that section seems to be taking place

New sawmills are going up and the old ones are increasing

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...ITH U. TULLE ROCK HARBOR, LA.

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their capacity. Practically the only route—certainly the cheapest route—these mills will have is by water to Jefferson or Mooringsport. In addition there are very large deposits of excellent iron ore near Jefferson which have not hitherto been adequately worked. The old furnace has been taken down, a new one has been installed, and the whole plant remodeled. By September 1 it is expected to start up with a capacity of 100 tons a day. The manager of the plant expects to ship out his iron and ship in his coke largely through Mooringsport, using the water route from there to Jefferson. Besides these industries, other freights, whether farm products or merchandise, can not fail to profit by the opportunity to reach the Kansas City Southern, a competing railway which goes through Mooringsport. As the channel is cleared of snags, more boats are being constructed, and it can not be doubted but that the channel will be actively used when the people feel assured that a permanence has been given to the navigable conditions.

Although the construction of a dam would at present destroy navigation from Jefferson and Mooringsport to Shreveport, it would not prevent the improvement of the entire waterway later if such a course should be determined upon, since all that would be needed would be a lock through the dam and a dredged channel below. In fact, the cost of the project previously advanced would not be increased, but might be diminished by constructing the lock and dredging the channel several years later, since the inroads of the falls would certainly diminish the amount of dredging.

In view of the increasing development of the resources of this section of the country, and in view of the saving in freight rates to be effected by providing water transportation or an outlet to a competing railroad, it is believed to be advisable to construct a dam across the foot of Caddo Lake. It is preferable that this dam should be accompanied by a lock with a dredged channel below, as above outlined, but if that can not be done at present, the construction of a dam alone will not interfere with the prosecution of the project at some future date, should it then be decided upon.

A letter* from Hon. Morris Sheppard, House of Representatives, is attached hereto. Accompanying this report are also a map and a profile of the waterways from Jefferson, Tex., to Red River.

Very respectfully, your obedient servant,

W. P. WOOTEN,
Captain, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[Fifth Indorsement.]

OFFICE DIVISION ENGINEER, GULF DIVISION,
New Orleans, La., September 19, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

It is difficult to consider the suggested dam at the foot of Caddo Lake without reference to the waterway below that point. Apparently unless some action is taken soon a stretch of some 38 miles of navigable waterway will be destroyed. By building a proper dam near the mouth of Caddo Lake, providing suitable foundation be

* Not printed.

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found for the security of such dam, some 38 miles of navigable waterway will be preserved. If it were possible to construct a dam at the present situation of the falls 6 miles lower down, that might be desirable for the preservation of Soda Lake, but it is understood that the banks are too low and such a dam can not be constructed there at a reasonable cost. The annual reports show that the removal of the Red River raft lowered the water surface in this section of the upper river, and since a part of the drained area can be recovered by the dam, as suggested, it is possible that this should be done for that reason alone; but aside from this the maintenance of a pool 38 miles in length in a navigable condition is worth the probable cost.

I therefore am of the opinion that a suitable dam should be built, if practicable, at the foot of Caddo Lake, and so recommend.

E. H. RUFFNER,
Colonel, Corps of Engineers,
Division Engineer.

[Seventh indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., September 30, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

The waterway between Jefferson, Tex., and Shreveport, La., about 65 miles in length, consists of Cypress Bayou, Fairy Lake (now called Caddo Lake), Big and Little Willow passes, Soda Lake, Twelvemile Bayou, and Red River. Many years ago this waterway was navigable practically the year round, and Jefferson was an important shipping point, its water-borne commerce being quite large. The removal of the raft in Red River resulted in the cutting out of its bed and the consequent lowering of its surface, which was followed by the partial draining of the waterway between Jefferson and Shreveport, as this was connected in many places with Red River. This lowering of the water surface has now reached a point which practically prevents navigation in the lower part of the waterway, but the upper portion from Jefferson to the foot of Caddo Lake is still navigable for light-draft vessels practically the year round. The slope of this section is very slight and the construction of the dam now proposed would convert this into a pool some 38 miles in length.

Much of the slope between Caddo Lake and Shreveport is concentrated in a short distance in what is known as the "falls," which is in effect a series of rapids. Owing to the sedimentary nature of the material over which the rapids pass they are constantly working upstream, draining the pools as they proceed. It appears evident that if this process continues the falls will eventually reach and drain Caddo Lake and Cypress Bayou, and destroy the existing navigation between Jefferson and Mooringsport. The object of the proposed dam is to maintain a navigable depth through Cypress Bayou and Caddo Lake, and to arrest the progress of the falls at the point where the dam will be located.

Several plans have recently been devised to overcome the difficulties of navigating this waterway, but none of them have been [illegible]pted. Under authority of the act of March 3, 1905, a survey was [illegible] of a part of this waterway and a plan proposed for its improve[illegible]which involved the construction of a lock and dam at the foot of [illegible] Lake and the dredging of a channel from that point to Red

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River. The cost of this project was thought to be in excess of probable benefits and its adoption was not recommended. Dredging in the channel below the lock and dam represented a large part of the cost of the project, this item alone amounting to $200,000 out of a total of $525,000.

The plan now proposed is the construction of a dam only, omitting the lock and the dredging below. This will limit navigation to the section of waterway above the dam, but this is where the existing commerce is and where an improvement will be of greatest benefit. Moreover, if future conditions should arise making it desirable to carry navigation through to Shreveport, a lock could be constructed in connection with the dam as formerly proposed.

This waterway has been under improvement for a number of years, about $140,000 having been expended. The preservation and further improvement of navigation between Jefferson and Mooringsport is particularly desired, as this will stimulate competition with the railroads at those two points. Experience in this section of country indicates that competition thus created and maintained will result in considerable reduction in freight charges and material benefits to the community.

The amount of commerce now existing on this waterway is not large, due in a measure at least to the unsatisfactory and unreliable condition of the channel. New industries are reported at Jefferson and new mills on the lake and bayou, and it is believed from information presented that the proposed improvement would result in the development of sufficient commerce, coupled with its influence on freight rates, to justify the United States in undertaking the work, unless it should appear upon further examination that the cost of the dam will be excessive. The district officer states within that the cost of the dam would be about $100,000. It is presumed that the estimate is taken from the former survey and is approximate, and, therefore, it is recommended that the district officer be given an opportunity to revise it if deemed necessary. It is believed that no additional funds will be required for this purpose.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

[Eighth indorsement.]

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, October 3, 1907.

Respectfully submitted to the Secretary of War.

This is a report on preliminary examination authorized by the river and harbor act of March 2, 1907, of Caddo Lake, with a view to determining the advisability of constructing a dam at the foot of said lake on the waterway connecting Jefferson, Tex., with Shreveport, La.

Inviting attention to the report of the Board of Engineers for River and Harbors, in preceding indorsement, I recommend that preparation of plan and estimate of cost of construction of a dam, as proposed, be authorized.

SMITH S. LEACH,
Acting Chief of Engineers.

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[Ninth indorsement.]

WAR DEPARTMENT,
October 4, 1907.

Approved as recommended by the Acting Chief of Engineers.

ROBERT SHAW OLIVER,
Acting Secretary of War.

PLAN AND ESTIMATE OF COST OF CONSTRUCTING A DAM AT THE FOOT OF CADDO LAKE, TEXAS AND LOUISIANA.

UNITED STATES ENGINEER OFFICE,
Dallas, Tex., November 2, 1907.

GENERAL: Referring to my indorsement[a] of October 16, 1907, on report of examination of Caddo Lake, I have the honor to report that my estimate of $100,000 as the cost of construction of the dam seems to be about correct.

For purposes of this estimate I have adopted the crib dam with sheet-piling foundations as the type to be used, and find that under local conditions the cost will be about $30 per linear foot. As the total length will be about 3,000 feet the total cost, including an allowance of 10 per cent for engineering and contingencies, will be very close to $100,000. The original estimate of $100,000 is therefore adhered to.

Very respectfully, your obedient servant,

W. P. WOOTEN,
Captain, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
Through the Division Engineer.

[First indorsement.]

OFFICE DIVISION ENGINEER, GULF DIVISION,
New Orleans, La., November 4, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army.

E. H. RUFFNER,
Colonel, Corps of Engineers,
Division Engineer.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., November 11, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

The district officer confirms the approximate estimate contained in his report on preliminary examination, which places the cost of the dam at the foot of Caddo Lake at $100,000.

Believing this amount is not unreasonable when compared with probable benefits, the Board is of opinion that it is advisable for the General Government to undertake the improvement of the waterway connecting Jefferson, Tex., with Shreveport, La., by the construction of a dam at the foot of Caddo Lake, as proposed by the district officer.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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[a] Not printed.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 221.

DULUTH HARBOR, MINNESOTA.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT BY A BOARD OF ENGINEERS OF EXAMINATION AND SURVEY OF DULUTH HARBOR, MINNESOTA.

DECEMBER 9, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed with accompanying illustrations.

WAR DEPARTMENT,
Washington, December 7, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated 5th instant, together with copy of a report by a Board of Engineers, dated June 20, 1907, on an examination and survey of Duluth Harbor, Minnesota, including entrance thereto, made in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 5, 1907.

SIR: A northeast storm of unusual severity, occurring late in November, 1905, occasioned the loss or severe injury of two vessels attempting to enter the Duluth entrance to Duluth-Superior Harbor. This entrance has a depth of 26 feet between piers 300 feet apart. In both cases the determining cause of the disaster to the ships appears to have been the touching of the bottom of the lake before reaching the outer ends of the piers.

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Considerable damage was done during the same storm to piers a wharves in the Duluth Harbor, and to vessels lying at the same, account of the severity of wave action transmitted through the ca to the inner basin. Public sentiment demanded an amelioration these conditions, and by a concurrent resolution passed June 20, 19 Congress ordered an examination and survey of Duluth Harbor w a view of determining what modifications, if any, should be made the then existing plan of improvement, apparently having in vi the difficulties above outlined. On account of the importance of t matter, a Board was appointed on the recommendation of the Ch of Engineers, which Board submitted a report, published as Ho Document No. 82, Fifty-ninth Congress, second session. The rep of the Board was exhaustive, and was fully reviewed by the Ch of Engineers in presenting it to the Secretary of War for tra mission to Congress.

The conclusions of this report were that none of the remed suggested by interested parties was practicable. Widening t Duluth Canal is open to serious objections, one of which is that would increase the severity of wave action in the inner basin, a while ameliorating one difficulty complained of would aggravate a other. The Board did find, however, that, in view of the proba cause of the accidents to vessels in the storm of November, 19 greater safety might be given to the Duluth entrance in hea weather by increasing the depth in the lake just outside the ca from 26 to 30 feet, so that under no conditions of lake level or wa action would a vessel loaded to pass through the canal be likely touch bottom outside.

The Board found the only practicable remedy for the danger entrance through the Duluth Canal in extra heavy weather to lie a modification of the project then in process of execution at Super entry, so that in heavy weather vessels may enter at the latter po and reach Duluth Harbor by the inside route.

In the river and harbor act of March 2, 1907, under the head "Improving harbor at Duluth, Minnesota, and Superior, Wisconsi Congress authorized the Secretary of War to adopt the recommend tions of this Board as to the change in the plan for the Superior ent so as to provide an adequate stilling basin by two breakwaters wi an opening of 600 feet between their adjacent ends and a ca through Minnesota Point 500 feet wide, protected by short jetti This act also stated—

> and the Secretary of War may appoint a board to make a reexamination a survey of the Duluth Harbor and entrance thereto with a view to ascertain the best method for improving the same, either by the extension of the exist piers, the widening of the channel, the construction of one or more breakwate and the enlargement of the inner basin in the interests of commerce, and order to afford a safer entrance to said harbor in times of storm, and bet protection to shipping and property within said harbor; also with a view ascertaining the advisability of constructing a new entrance to the Duluth H bor basin of a width suitable for the needs of commerce, not exceeding thousand feet, and the protection of the same by either an outer or inner bre water, or both, such new entrance to be located southward from the pres Duluth entrance and so as to cause the least practicable interference with t waters of the Saint Louis River, together with the probable effect of su entrance upon the property within said harbor.

compliance with this law, and on the recommendation of t of Engineers, another Board of Engineer officers was appoint

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with personnel entirely different from the former one, and the report of this Board is now submitted for transmission to Congress.

It will be noted that this law, while adopting the remedy proposed by the former Board, orders practically a reconsideration and review of all the propositions which were unfavorably considered by that Board. The present Board has made an exhaustive discussion of the subject, after a personal examination of the locality and a widely advertised and well-attended public hearing, at which, it is believed, every person who had any desire to express himself on the subject did so. The Board found the local sentiment very much divided, so much so as to form no basis of support for conclusions, with the possible exception of the project for an extensive breakwater or breakwaters in front of the Duluth entrance. To this subject the Board gave most careful consideration and, for reasons fully stated in the report, decides adversely to the breakwater project. The Board, however, indicates the best positions for two such breakwaters, in case it is decided to build them, its opinions to the contrary notwithstanding. The report of the Board confirms the views previously held as to the impracticability of widening the Duluth Canal and the futility of extending the piers and supports the recommendation previously made for a deepening of the lake approach to the canal entrance. The Board finds, however, that an enlargement of the inner basin at the Duluth end of the harbor would be advisable, and recommends dredging to certain proposed lines.

This report has been referred to the Board of Engineers for Rivers and Harbors, and after careful consideration of the subject this Board concurs in the views and recommendations contained therein.

I also concur and recommend that provision be made by law for the dredging proposed by the Board in the lake approach to the Duluth Canal and in the Duluth inner basin.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

REPORT OF A BOARD OF ENGINEERS ON EXAMINATION AND SURVEY OF DULUTH HARBOR, MINNESOTA, INCLUDING ENTRANCE THERETO.

DULUTH, MINN., *June 20, 1907.*

GENERAL: The board of officers of the Corps of Engineers convened by paragraph 2, Special Orders, No. 8, War Department, Office Chief of Engineers, March 9, 1907, to make examination and survey of the Duluth Harbor and entrance thereto, for the purposes prescribed in the river and harbor act of March 2, 1907, has the honor to make the following report:

The extract of the river and harbor act of March 2, 1907, is as follows:

Improving harbor at Duluth, Minnesota, and Superior, Wisconsin: Continuing improvement, and for maintenance, including additional dredging near the draw span of the Northern Pacific Railroad bridge, seven hundred and twenty-five thousand dollars, of which amount three hundred thousand dollars shall be expended upon the Superior Entry, the plan of which the Secretary of War

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may modify and enlarge in accordance with the report submitted in House Document Numbered Eighty-two, Fifty-ninth Congress, second session, and the Secretary of War may appoint a board to make a reexamination and survey of the Duluth Harbor and entrance thereto, with a view to ascertaining the best method for improving the same, either by the extension of the existing piers, the widening of the channel, the construction of one or more breakwaters, and the enlargement of the inner basin in the interests of commerce, and in order to afford a safer entrance to said harbor in times of storm, and better protection to shipping and property within said harbor; also with a view to ascertaining the advisability of constructing a new entrance to the Duluth Harbor basin of a width suitable for the needs of commerce, not exceeding one thousand feet, and the protection of the same by either an outer or inner breakwater, or both, such new entrance to be located southward from the present Duluth entrance and so as to cause the least practicable interference with the waters of the Saint Louis River, together with the probable effect of such entrace upon the property within said harbor.

Pursuant to the call of the senior member, the Board met at the United States engineer office at Duluth at 1 p. m., June 18, 1907, and proceeded on the U. S. S. *Vidette* for a complete examination of the harbor, passing from the Superior entrance into the lake and reentering the harbor through the Duluth entrance. On this trip the Board was accompanied by the Members of Congress from the Duluth, Minn., and the Superior, Wis., districts and other prominent citizens interested in the matter, and during the trip these gentlemen had an opportunity to explain to members of the Board their views as to the needs of the harbor in the way of improvement.

On June 19 a public hearing was held at the Duluth Commercial Club. Notice of this meeting had been given wide publicity, in which notice all interested were invited to be present and to express their views in writing. A stenographic report of the hearing was taken, and this, with the written statements submitted, is attached to this report.

This public meeting was closed only after it appeared that every one present who desired to speak had been heard.

Executive meetings were held in the afternoon of the 19th and again on the 20th, at the former of which the district engineer officer was present for a portion of the time and gave his views on the several questions before the Board and furnished information asked for by the members.

Final adjournment was on June 20, the substance of this report having been agreed upon.

Duluth-Superior Harbor, Minnesota and Wisconsin, is situated at the head of Lake Superior, and by reason of its geographical situation and its present facilities is one of the most important harbors on the Great Lakes, its aggregate marine commerce for the calendar year 1906 being 29,171,221 tons, the aggregate value of which was $251,899,844.

A description of this harbor may be found on pages 43 to 54, Bulletin No. 17, "Survey of the Northern and Northwestern Lakes," and on pages 3 to 9 of the Supplement thereto, numbered 1, and attention is invited to this bulletin, as well as to the charts issued by this Survey, of the harbor of Duluth and Superior and of Lake Superior. An examination of this latter chart will show that the harbor entrances are protected from all but northeasterly storms. These
[illegible]heasterly storms have a reach of at least 150 miles, and a pro-
[illegible]d blow from this direction produces waves of great height,
[illegible]n run in through the Duluth entrance and produce considerable

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disturbance at the wharves in Duluth basin. Another effect of such wind is to pile up the waters at this end of the lake, which fills the bays at this higher level, and when the lake water recedes the outrush through the entrances produces very swift currents. In this connection attention is invited to the records of northeasterly winds furnished by Captain McDougall, with his written statement.

Description of the great storm of November 28, 1905, may be found in the annual report of the district officer for 1906.

It appears from the statements made at the public hearing and from the written statements submitted that the principal desires of the navigation interests are the suppression of wave action in Duluth basin, due to northeasterly winds, and the adoption of such measures as would give a safe entrance into the harbor during storms. As for the former, it appears that during an average year the damage caused to the docks and other structures by the wave action is small, but that during the great storm of November 28, 1905, the damage was considerable, amounting probably to between $50,000 and $100,000. There is also a slight loss, difficult to estimate, due to delays to vessels when unable to lie alongside of certain wharves during northeasterly gales. The danger to vessels entering through the Superior entrance during severe storms is shown by the experience of two vessels during the storm of November 28, 1905.

The steamer *Mataafa* with a barge in tow was unable to keep the sea by reason of the force of the winds and waves, and sought the Duluth entrance for safety. Abandoning her barge outside, she attempted to enter, struck bottom outside the piers, sheered to starboard, struck the north pier, swerved around, and went ashore just north thereof. This vessel was subsequently raised, and the extent of the damage probably did not exceed $225,000, but nine lives, most unfortunately, were lost. The anchored barge safely rode out the storm. The steamer *Isaac L. Ellwood*, which endeavored to make the entrance during the storm, appears also to have struck bottom just outside of the piers and to have sheered into the north pier, striking the same twice on her way in. Subsequently this vessel sank inside the harbor, but was floated and repaired, the estimated damage being $10,000. Both of the vessels mentioned encountered remarkably heavy seas at the entrance and strong currents running out. During the height of the same storm two vessels entered without touching the piers.

Storms of this character are of rare occurrence; in fact, the Board has not bee nable to find record of another occasion when the combination of wind, waves, and current would render entrance as hazardous, or even nearly as hazardous, as it was during this storm. According to the records, the total number of vessels that have run upon Duluth piers within ten years is 5, the estimated damage aggregating $304,200. During the same period the total number of entrances was 40,417. The total number of vessels wrecked on Lake Superior during the past ten years west of a north and south line through Sand Island has been 35. It is quite possible that all of these vessels would not have been lost had their masters felt that a safe entrance through Minnesota Point lay to leeward of them.

As to the best method of accomplishing the two improvements mentioned above as desired by the navigation interests, a wide difference of opinion prevailed; the minority of those present advocated the opening of a new and wider entrance or canal through

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Minnesota Point suitably protected by breakwaters. One of the advocates of this plan proposed to fill up the present Duluth Canal to a depth of 10 or 12 feet to get rid of the wave action within the Duluth basin. A further argument advanced in favor of this central opening was the shortening of the time for vessels passing out from St. Louis Bay. A majority of the speakers and writers appeared to advocate the construction of a breakwater practically parallel to Minnesota Point and about 1½ miles from the ends of the canal piers, beginning at the shore near Twentieth avenue, Duluth, and running out about 1½ miles to a point somewhat beyond its intersection with a line in prolongation of the south Duluth Canal pier. This location was explained by Captain McDougall in his statement. In the opinion of its advocates, this breakwater would protect the Duluth Harbor basin from wave action, would give a safe entrance through the Duluth Canal, and would provide a protected outer harbor of refuge for boats which, for any reason, could not enter the inner harbor. The advocates of the breakwater argue that an opening through Minnesota Point would seriously injure the harbor, while the advocates of the new opening find in the breakwater a serious menace to safe navigation. A third view is held by the representatives of Superior that the navigation interests of that section of the harbor do not desire any change in the present conditions, except for the completion of the work at the Superior entrance in accordance with the present approved project. While these representatives do not oppose any works for improving the Duluth entrance, they express a decided objection to the cutting of an additional opening through Minnesota Point. The above is a condensed statement of the views expressed orally and in writing at the public hearing.

At its executive sessions the Board gave consideration to these views, in conjunction with other information at hand; and then proceeded to a discussion in detail of the several points required by the river and harbor act to be reported upon. The conclusions of the Board are as follows:

1. That it is undesirable to construct a new entrance to the Duluth Harbor, for the reasons, first, that three entrances to the harbor are unnecessary, and two are now in existence and firmly established in location by well-constructed permanent works, and, second, that an additional opening would injure Minnesota Point as a natural breakwater, both by permitting increased fluctuations inside the harbor and increased currents in and out of St. Louis Bay and by rendering it less stable. Were it practicable to relocate the Duluth entrance to the harbor, it would be advantageous to move it toward the south, but the cost of closing the present and constructing a new entrance makes it quite out of the question, the benefits to be derived from such change being entirely incommensurate with the cost.

2. In the opinion of the Board, the extension of the existing piers would not improve the entrance, and it does not therefore recommend such extension.

3. "The widening of the channel" (by which it is thought that increasing the width of the entrance is meant) could only be accomplished by the building of a new pier and the removal of one of the existing piers. This would also cause the removal of the city's bridge across the entrance. Such widening would make somewhat safer the passage of the entrance during storms, but on the

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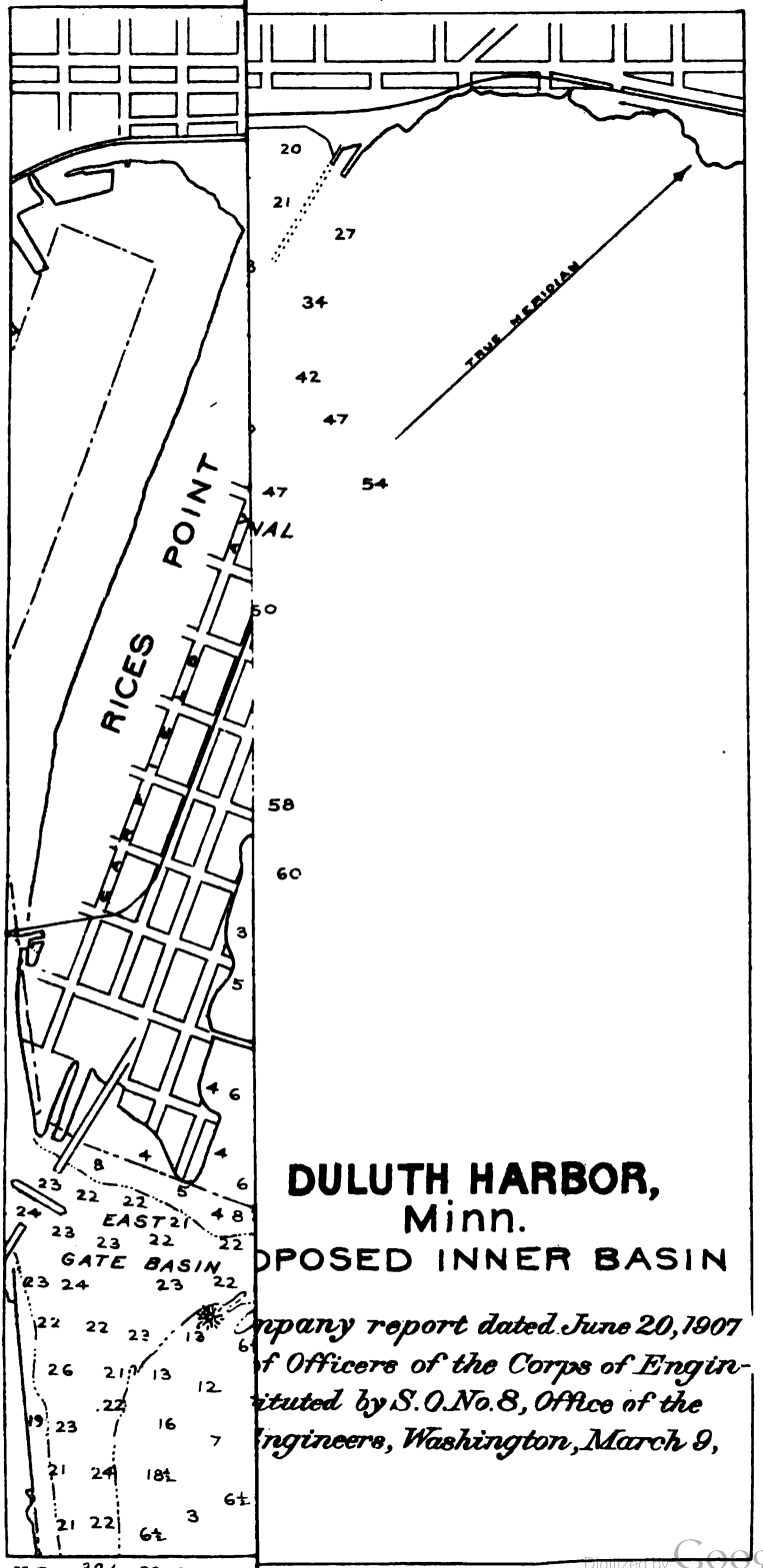

DULUTH HARBOR,
Minn.
OPOSED INNER BASIN

npany report dated June 20, 1907
f Officers of the Corps of Engin-
ituted by S.O. No. 8, Office of the
ngineers, Washington, March 9,

THE NORRIS PETERS CO., WASHINGTON, D. C.
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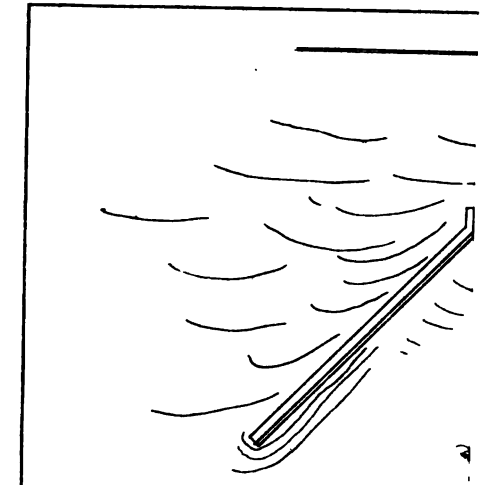

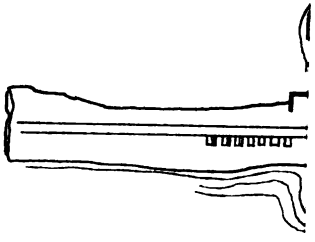

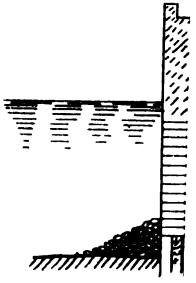

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other hand would probably increase the wave action at the wharves in the Duluth basin. The Board does not recommend such widening.

4. On account of the strength with which the construction of a breakwater was urged, the Board regarded the determination of this matter as the most important question before it.

After mature consideration, it is the opinion of the Board that at present such construction is inadvisable. Under the adopted project breakwaters are to be built at the Superior entrance, which has a width of 500 feet, with a view to rendering this entrance safe for passage during the most severe storms. Should this improvement serve its purpose, no further construction would be necessary to render the Duluth Harbor a place of refuge for vessels which are in the western end of Lake Superior during time of storm. Until this improvement is completed and it is ascertained whether it will have the designed effect, it would not seem to be advisable to undertake extensive works to render the Duluth entrance also safe of passage during the occasional severe storms.

The other object desired to be accomplished by a breakwater is the suppression of the wave action in the Duluth basin. It is believed that the small average annual damages caused by this wave action would not warrant the great expenditure necessary for the construction of a breakwater protection. The Board has entered into general discussion only as to the type of breakwater and the location best suited to the improvement of this entrance. A breakwater, or breakwaters, would of necessity be constructed largely in deep water and would be of considerable length and would therefore be costly of construction. It is probable that the breakwater advocated by Captain McDougall and other speakers would cost between four and five million dollars.

5. The Board deems it advisable that the inner basin be enlarged by dredging to a depth of 22 feet, low water datum, the area marked on the tracing submitted herewith, and that the Minnesota Point harbor lines be changed to conform thereto. This dredging will increase the anchorage area of the Duluth basin from 171 acres to 380 acres, and will also facilitate the movement of large ships between the Duluth Canal and the entrance to St. Louis Bay. The estimated quantity of material to be removed to accomplish this enlargement is 4,590,000 cubic yards, measured in place, the estimated cost of which is $550,800.

Very respectfully,

H. M. ADAMS,
Colonel, Corps of Engineers.
CHAS. E. L. B. DAVIS,
Colonel, Corps of Engineers.
J. G. WARREN,
Major, Corps of Engineers.
HARRY TAYLOR,
Major, Corps of Engineers.
H. BURGESS,
Captain, Corps of Engineers.
ARTHUR WILLIAMS,
First Lieut., Corps of Engineers, Recorder.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.

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[Second indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., July 15, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

The Board of Engineers for Rivers and Harbors has given careful consideration to the within report of the special board on a reexamination and survey of Duluth Harbor, Minnesota, ordered in section 1 of the river and harbor act of March 2, 1907, and concurs in the views and recommendations contained therein.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

PROCEEDINGS OF THE BOARD.

Proceedings of a Board of officers of the Corps of Engineers which met at Duluth, Minn., pursuant to the following order:

SPECIAL ORDERS, No. 8.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, March 9, 1907.

[Extract.]

* * * * * * *

2. By authority of the Secretary of War, and in accordance with the provisions of the river and harbor act of March 2, 1907, a Board of officers of the Corps of Engineers, to consist of Col. Henry M. Adams, Col. Charles E. L. B. Davis, Maj. James G. Warren, Maj. Harry Taylor, Capt. Harry Burgess, First Lieut. Arthur Williams, recorder, is hereby appointed to make a reexamination and survey of the Duluth Harbor and entrance thereto for the purposes prescribed in the said act.

The Board will assemble at Duluth, Minn., upon the call of the senior member and is authorized to visit such other points as it deems necessary for the proper performance of its duties.

Upon the completion of the duty assigned them, the members of the Board will return to their proper stations.

* * * * * * *

By command of Brig. Gen. Mackenzie:

FREDERIC V. ABBOT,
Lieut. Col., Corps of Engineers.

UNITED STATES ENGINEER OFFICE,
Canal Park, Duluth, Minn., June 18, 1907.

At the call of the senior member the Board met at 1 p. m. Present: Colonel Adams, Colonel Davis, Major Warren, Captain Burgess, Lieutenant Williams, recorder. Absent: Major Taylor. His absence was due to his having been misinformed as to the location of the United States Engineer Office. He joined the Board at 2.30 p. m. At all other meetings of the Board all the members and the recorder were present.

At 1.20 p. m. the Board, together with the district officer, Maj. Graham D. Fitch, Corps of Engineers, and a number of citizens of Duluth and representatives of business firms of the vicinity, went

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aboard the U. S. launch *Vidette* at the Duluth entrance to the harbor; inspected Duluth Harbor; St. Louis Bay as far as Grassy Point; returned through Superior Harbor; out through Superior entrance, and thence through the lake to the starting point. During this trip the parties aboard had an opportunity to express to members of the Board their ideas regarding improvements of the harbor.

At 4.10 p. m. the Board went into executive session. The Member of Congress from the Duluth, Minn., district appeared and requested that a photograph of the Board be taken for publication in a morning newspaper. This was refused. The act authorizing the Board and the order appointing it were read, and also the following letter and notice:

ENGINEER OFFICE, UNITED STATES ARMY,
Canal Park, Duluth, Minn., May 3, 1907.

COLONEL: In accordance with request contained in your letter of April 25, I have the honor to inform you that I have arranged for a public hearing on the subjects to be considered by the Board of Engineers appointed by Special Orders, No. 8, Office of the Chief of Engineers, 1907, at 10 a. m. June 19, 1907, at the Commercial Club rooms, Duluth, Minn.

This location is the most convenient and commodious for all concerned.

This information will be given wide publicity at the head of the lakes, both now and later, just before the meeting of the Board.

Very respectfully,

GRAHAM D. FITCH,
Major, Corps of Engineers.

Col. H. M. ADAMS,
Corps of Engineers, U. S. Army, Buffalo, N. Y.

NOTICE.

A Board of officers of the United States Corps of Engineers has been appointed to make a reexamination and survey of Duluth Harbor and entrance.

This Board will hold a public hearing at the Commercial Club rooms, Duluth, Minn., on Wednesday, June 19, 1907, at 10 o'clock a. m., and all parties interested in the subjects to be considered are invited to submit their views, preferably in writing, for the consideration of the Board.

H. M. ADAMS,
Colonel, Corps of Engineers,
Senior Member of Board.

The Board decided that it was best not to enter into any discussion of the questions involved until after the public hearing. The recorder was directed to secure a stenographer to record the proceedings at the hearing.

At 4.20 p. m. the Board adjourned to meet at the time and place named in the notice.

DULUTH, MINN., *June 19, 1907.*

The Board met at 10 a. m. A stenographer was present and made a complete record of the hearing. Over 100 persons were present, among them the Members of Congress from the Duluth, Minn., and the Superior, Wis., districts. The senior member announced the hearing open, and everyone present was given an opportunity to express his views. At 12.30 p. m. it appeared that no one desired to be heard further, and the Board adjourned to meet at 3 p. m. at the Engineer Office.

The Board met pursuant to adjournment at 3 p. m.

All written communications addressed to the Board were read. The district officer was called before the Board and gave certain information concerning the harbor and also gave his views concerning its further improvement. The Board considered all facts relating to the case and came to substantial agreement on all points which were

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to be considered. The junior member was directed to prepare a draft of the Board's report and to submit the same at the next meeting.

At 4.30 p. m. the Board adjourned to meet at the same place at 1 p. m. June 20, 1907.

UNITED STATES ENGINEER OFFICE,
Canal Park, Duluth, Minn., June 20, 1907.

The Board met at 1 p. m.

The report written by the junior member was read, some minor alterations were made, and it was adopted.

Arrangements were made for having the report and accompanying papers properly typewritten and sent to the members of the Board for signature.

There being no further business before it, the Board adjourned at 1.40 p. m. sine die.

ARTHUR WILLIAMS,
First Lieut., Corps of Engineers, Recorder.

REPORT OF PUBLIC HEARING HELD BY THE BOARD.

SENIOR MEMBER OF THE BOARD. At the suggestion of Mr. Adam Bede I will ask Mr. George R. Spencer to speak to us first.

GEORGE R. SPENCER. I am here to represent the Consolidated Elevator Company. We have 8 elevators situated on the east side of Rices Point. This property was built after the canal was opened and during the time of its former width and all our plans were made at that time.

The necessities that have arisen for making a wider canal have created a condition here of which, of course, you have heard a great deal. And this increased width seems to allow so much sea to come in there that at the end of every big storm they do us a great deal of damage. I refer to big storms such as we had two years ago. That storm cost us about $10,000 to repair our docks, and this spring we have had to do about $6,000 worth of dredging as the result of it.

We are not complaining against the increased width of the canal because, I think, that was necessary: but this improvement having been made, necessarily, it seems to us, our property should be accorded some sort of protection. I don't know what to suggest as to the protection. We are perfectly willing to rely upon the judgment of the engineers, who are skilled men in that business, but we think that some protection to the canal should be afforded so that these seas will not have this big sweep at our property.

Speaking as an individual, it seems to me that we should have some protection from the ravages of big seas here in the time of big storms. This whole end of the bay was platted and the improvements were made based upon the conditions as they formerly existed. What we need now is something to make it possible for vessels to lay here easily and to protect the property here from damage. I do not see how the cutting of a third canal down below is going to remedy the matter. If you close up this canal we simply make this end of it here nothing more than a cesspool. And if the central canal is built it is conceded that that must have some protection. Now, if you can protect that one, there doesn't seem to be any reason why this one down here should not be protected.

There is no need of a third canal, and this improvement down here, it seems to me, can be made at far less expense than to go to work and throw away all this money that has been spent here and build another canal farther down.

Now, I am perfectly willing to leave the plan to the engineers. I have no plan to suggest. I know nothing about that. I am not skilled on that. I [illegible] want to urge upon this commission the necessity of doing something to [illegible]is end of the harbor.

[illegible]ior member of the Board called upon Capt. Alexander McDougall, [illegible] as follows:

[illegible]DER MCDOUGALL. I think that we have had a wrong impression among [illegible]erests as to what the west end of Lake Superior is as compared with

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other lake harbors. And from the fact that it was not generally understood, men who were intelligent and well posted on harbors and shipping would be too ready to pass judgment upon the general appearance of this great natural breakwater that we have here. And I can not blame some of them for saying, "Cut her in two and block up both ends." If I lived in Cleveland or in Buffalo and talked with lake shipping or even with engineering departments I might express myself the same way. But I have lived here from the beginning of the port. I have been active in agitating its welfare, and from a very extensive experience, not alone at home, but on the coasts among other places and for twelve years as master of the first big ships coming to the port and for fifteen years as the representative of more than 50 per cent of the ships coming to the port, and ever since being active in looking to the welfare of the port, not being a large property holder or anything that would lead me to be biased, and as chairman of a joint commission known as the Duluth and Superior Harbor Commission for years, going to Washington in the interests of this port, and most always at my own expense, to urge and assist our Congressmen in getting such appropriations as might be required, I have felt bold enough to push myself forward to this Board with a class of information that I think should be well considered.

The first view to take of the situation here is the view of the head of Lake Superior, where it focuses itself down into a narrow point, concentrating the wind and also the waves, when they occur, in this direction, creating a condition different from what exists in any other of our lake ports. In fact, it would be considered extraordinary at sea, in an arm of the sea extending inland surrounded by high lands, as we are.

We have northeast winds prevailing at this port; so I collected the statistics for the last ten years which, I think, are not as numerous in northeast storms as they were in the first ten or twenty years of the port. In the last ten years we have had over 200 storms from the northeast with a velocity of greater than 25 miles an hour. We have had 40 storms that had a greater velocity than 45 miles an hour; up in the sixties and seventies many of them. In the fall, when we have our greatest northeast storms, they often follow a northwest storm.

Vessels bound for the port are seeking shelter under the high north shore of the lake, having wind protection, having also real observation for guidance to the entrance to the port which is fortunately situated near the base of this point, which entrance was fortunately made in the shingle or heavy beach gravel that is here extending south of the canal 2,000 or 3,000 feet, diminishing in size until it becomes sand, and a very fine sand formation as it extends to the south of the canal entrance clear to the Wisconsin shore.

The cutting of the point, which was wisely considered in the early days of making this harbor—the base of the point consists of detached pieces of granite and trap formation from the north shore, while the south shore is a sand formation and is the grinding and wearing of the south shore following up and forming Wisconsin Point and afterwards Minnesota Point from the wearing away of the sandstone formation on the south shore—consequently a greater shifting of those sands than would be in the shingle beach of our Minnesota Point at the base, and in the early days this was of great assistance to us, and I think is at the present time of very great assistance to avoid the dredging and taking care of the sand that might move otherwise. [Here the stenographer did not succeed in taking down the exact words of the speaker. However, the substance of his remarks is that the north end of Minnesota Point is chiefly shingle, diminishing toward the south into sand, of which is formed the central and southern parts of Minnesota Point and all of Wisconsin Point, and that the canal, having been cut through this shingle, caused less movement of the material in the vicinity than if it had been cut through the point where composed of sand.]

Now, the vessels coming to the port have about one-fourth the westbound cargo that there is of eastbound cargo. Consequently there are many more vessels coming without cargo or without much ballast than there are loaded and in condition to fight the storms when they come. Therefore the reason they hug this north shore and follow it for some protection.

These storms I have enumerated are not, many of them, northeast snowstorms that we fear. Snowstorms will occur here once in a while, and did occur in the seventies far more than they do now. I think during the seventies—from 1870 to 1881—we must have had a dozen of those tremendously severe northeast snowstorms, with blinding snow such that you could not see many lengths of the vessel; often you could not see half the length of the vessel. And under

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such condition as that, if you are out in the lake and coming along to find an entrance in the extreme end of a lake, on a shore where the vessel is helpless, without being able to turn about and face the fury of such a storm, as most of the vessels coming here are in all seasons of the year, or particularly in the fall, there is no place to go but to the beach.

The necessity of a harbor of refuge at this point is tremendous, and was illustrated in our storm of November 28, two years ago. Fortunately, at that storm there was a clearing up of the snow and the vessels could see how to make the entry. The condition was this: That storm, like all other storms, created a fluctuation of the water in the west end of the lake, and was at its maximum, probably. The water had risen in our bay about 3 feet above the level of its normal condition and then would recede quickly. The fluctuation of the lake which, as is well known to the engineers, is caused by either local or great storms, may reach suddenly up to its maximum, and, being so much higher than the inner basin, it will create that great current running in; but it will recede so much faster out in the lake than it is possible for it to recede from the inner basin, which in our case is so very large, that it creates a great current when running out. Now, when that current runs out and meets the waves created by the northeast storm outside is when we have our dangerous condition. Now, if you mix that with snow so the vessel does not see what she is doing, then is our most awful condition. I have experienced some of them myself. I have come in here in one of the great storms with a steamer towing a vessel, then the two largest vessels on the lake, and I can not explain or describe the feeling and the situation of the narrow escape that we had when going through with those two vessels.

Now, in regard to that condition along the north shore, I think our Government will protect us with more lights, one of which, I understand, is to be built very soon at Split Rock, east of Two Harbors, with a fog whistle attached; a light and a fog whistle at Two Harbors, with a fog whistle and a light at Stony Point, 12 miles down the shore. These will give us guidance that will help to find this entry. But when we find the entry, if we meet such conditions as I have seen many times—I think probably fifteen or twenty times in the last thirty-seven years—many of those large ships will not come in. They will stay out, either on the beach or some place else.

In the early days we had more numerous storms, and I was in hopes we had passed by them, that they would not occur again, until I was disappointed, on the 28th of November. I didn't happen to be here on that day, but learned of it, and that shows that they are going to continue—that they may come at odd times.

Now, the question of protecting us against those conditions—I can not see any other way than a breakwater. This has been discussed and agitated and recommended locally, and I have discussed it with the Engineering Department here at various times. I think it has never been lost sight of from the first opening of the canal here by the Engineering Department, that something of that kind would necessarily have to be put here. We have lived in great hopes it would come some day. We were fortunate in getting this great appropriation that took out 24,000,000 yards of material. I will say I had an opportunity to talk for that before the River and Harbor Committee. And if we hadn't got it we would be in a great pickle here to-day with the shipping that has come, such growth as no port on earth ever knew or experienced. The growth was tremendous. I remember in the discussion I had before the River and Harbor Committee that I told them what we were going to have here. I said, "Gentlemen, I couldn't make you understand what we expect up in this country. You have got to come and see it. The Lake Carriers' Association told me to offer you 100 ships to bring both branches of Congress here to see that great port with a view to understanding the possibility and probability of what the demand on shipping is going to be." I did not tell half. I think I could not tell half now. If we had that breakwater that we have in view, the entry would be safe for the 40,000,000 tons of freight in and out of this port, which in itself, if that breakwater would cost four millions of money, would only make 10 per cent or 10 cents a ton on the product of the port. We are paying to-day on about $100,000,000 of insurance on ships to and from this port. The average rate of insurance on a first-class large vessel is about 4½ or 5 per cent, or close to 5 per cent. The older vessels pay as high as 8 or 9 per cent, in addition to pro rata on cargo. You see, if we could save upon the insurance alone half of 1 per cent value of the vessels, that would pay for the interest in building a breakextensive as anyone can conceive here at the present time and that to

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Now, our lake business is a benefit to the people, not to the port of Duluth alone, and it is explained probably as follows: I have in my experience here been the agent and representative of both vessel and the grain that went out of this port when I paid 3½ cents per bushel freight and 3½ cents per bushel insurance on that same freight. What has brought about the great change? It is the improvement of lake navigation. What has done it? Light-houses, fog whistles, channels. The people are getting this benefit, and the insurance rate to-day, I think, is only about a third of 1 per cent.

That illustrates the conditions as they progress and as they improve.

We have an illustration in the storm of November 28, when a million or two of property went to destruction here and the underwriters had to pay for it, and the condition of the insurance the following year is an indirect levy as against the amount of product for some time to come.

The appoach to this port of a fleet of vessels will be fraught with fear created from the talk of that last big storm, and it is going to make them afraid of this entry until some assurance is presented to them that we will have protection. By a breakwater we will have that protection, and by that breakwater we would have conditions to take care of the fleet that we are going to have.

A little illustration came in last spring. We had 100 big ships in here at once. They were monsters. No one on earth ever saw such a fleet of ships in any other port.

Now let us imagine a condition something like this: Down at the Soo some fellow hits another one and he settles down to the bottom and they are all detained there. They all make a rush for the head of Lake Superior. In the rush for the head of Lake Superior they come any way; a channel may be here or it may be over there, at Superior entry, and a fellow comes in either entry and he butts these piers and he settles down to the bottom there at the piers, which we expected three or four times last summer and also two years ago. The other fellows are coming on without anything to tell them what is ahead of them. They may be all in a heap out here. If you have a breakwater such as we have been discussing, and with such a breakwater as that which has on its end the light-house, its fog whistle, and all the modern appliances for signaling, you signal that fleet as it comes in either with the whistle signal or by tugs which may be lying under shelter of the breakwater. They will round to under that breakwater; they will come under that breakwater into the best possible holding ground.

When we had that storm of November 28 the ship that struck the pier left her consort outside the harbor. They lay there to an anchor and fought that gale out. It was a sight to see, the waves passing over her, and she held on, showing the quality of the mud and clay that were there to hold her—the holding ground.

Now, we have those conditions, and we have many more bearing upon it that we can not think of all at once. And I would not expect a lot of gentlemen to come here, be they ever so intelligent, and see us as we are on a nice summer's day in June and fully appreciate what we are in the enormous northeast snowstorms that we get at the head of the lake.

We began to discuss this matter with our vessel interests, who a year ago suggested that we make the middle channel, and in order to gain their point they went at us to describe the dangers of a breakwater, and they were all against a breakwater harbor.

Now, there were very good reasons for that, and of those good reasons I would like to make an explanation by map.

They were brought up around the Cleveland breakwater and around the Buffalo breakwater, which in themselves were minute affairs compared with what our simple breakwater would make for us as an outside harbor, and that led them to oppose our breakwater, I think, unfairly. But I think, since we have been viewing it from a more careful study, that there would not be the opposition to a breakwater to-day if it was presented to them as I propose to present it to you gentlemen now. And with your permission I will take some charts and explain some of those matters, both in the navigation of the lake coming westward and also as to the harbor area and the other features as it looks to me.

I want first to impress some of these ideas. We will take the Buffalo Harbor as an illustration. Here is the condition in Buffalo Harbor [referring to chart]. There is the breakwater, which is about 2,000 feet from the end of the channel. When you enter the channel it is only 150 feet wide. You have the current running down here into Niagara River, so when your vessel is half into Buffalo entry the other half is out in the current of the Niagara River. You have a

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breakwater there that was designed when we had the canal schooners—when we had the little vessel that didn't want any more room than that. Now we have the 600-footer, with possibly longer vessels coming after it. In those days had they been wise enough to put that breakwater where we want this Duluth breakwater, a mile out from shore or a mile and a half (this other plan where it is a mile and a half out), we will see what the conditions would be in Buffalo Harbor. That is the direction of the breakwater. There we have a sweep of lake for 200 miles.

When that strikes that point it is modified to some extent with shoal water approaching the harbor, so we don't get as strong a wave as we do at Duluth. If you did you could never enter Buffalo Harbor under those conditions. Having shoal water there, it breaks the weight of the waves some and modifies it. The breakwater where it is is a menace to navigation at that port. The true difference is on the same scale as if the Buffalo breakwater were a mile or a mile and a half out.

Then, we will take the Cleveland breakwater. Here is the Cleveland breakwater. There is an ordinary vessel coming into the Cleveland breakwater. He has no place to turn on either side. There is not water enough. He has got to enter through here. That entry is about 1,400 feet out, or something like the Buffalo breakwater. This breakwater was designed also at the time—in the early days—when we had the small vessel; all of which I have seen, and I remember the agitation for this, and I helped to have some talk about it. At that time I think I lived in Cleveland in the winter. Now, if the Cleveland people had had a breakwater of the size I agitated at that time, a mile square, this is what they would have had. There would not have been the feeling which exists and with which they have impressed Mr. Burton, chairman of the River and Harbor Committee, and our Congressmen. They feel the want of room, and they thought our condition was the same. In the way of conversation it was difficult to understand it, but in the presence of the map and the scale of the right size, that showed it and that the breakwater that Mr. Darling has planned changed this shape and area of the Cleveland breakwater, if that was adopted for our Duluth Harbor, showing if there was room for 1 vessel in Cleveland, there is room for 150 in Duluth.

Now, we will go along to some of the other maps. There is the Duluth plan as outlined. The direction of the wind is about this direction, showing the protection we would have here, and the room and area we would have outside. Here is Sand Beach Harbor. Here is a harbor of modern construction and going on at the present time. Some Duluth men are contractors for it. That shows the harbor of Sand Beach. Sand Beach is supposed to take care of vessels from Lake Michigan, Lake Huron, and Lake Superior who may need the refuge and protection there. There is the size of the Sand Beach Harbor. Here would be the size of a mile square in Duluth Harbor. There would be the size of a mile and a half square in Duluth Harbor. Sand Beach is going ahead to build a harbor of refuge and we are six or eight times as large in a mile and fifteen or eighteen times as large in a mile and a half square as inclosure inside our proposed breakwater, with room in an inclosure of that kind to give shelter for the great fleet that may come here and need it all at once. That illustrates in its way the question of the room that either of those produce.

Now, we take a look at Lake Michigan and at Lake Superior. I have not got a map of Lake Erie, but it is much the same. Now, we can observe from Lake Michigan, we have about the same trend of wind, and the same distance we have got on Lake Superior, northeast or north-northeast. That is about our trend. When we reach this end of the lake, there the lake is wider, of course. Here is Lake Superior laid out on this chart, with the same scale to the mile. This line coming around here would be the west end of Lake Superior, being so much smaller than the area of south end of Lake Michigan. The object of drawing this line in here is to illustrate that a wind blowing from a southeasterly direction—the sea that it might make inside the Chicago breakwater. A sea from this direction might make considerable disturbance, while a sea from this quarter inside the Duluth breakwater would not have but a very short run. It, in itself, is a lesson better than I can explain it—to look at the map as it is. Take a look at Lake Superior. We will say we have practically the same distance, the same contention with the wind, only that focuses it up in this end, where we get a higher velocity.

Our high land no doubt has a bearing upon narrowing the wind in here and forcing it into the west end of Lake Superior. We never get winds from the southeast. I think in all my time here I never saw more than a breath of wind from the southeast. It is always from the northeast or northwest, with occa-

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sionally a southwest wind. But this high land has a great deal to do with shooting that wind down into this point, which gives us more wind and gives it to us at a greater velocity than probably any other part of the lake in the numerous storms. So we have much like they have in Lake Michigan to contend with. We have a map showing the head of the lake.

Here is the Chicago breakwater, which is what we want. We want a breakwater like that. That is all we want. That is in so no one finds fault with it. It is little over a mile long; it is a little over a mile from the end of the piers. There they have a condition when you get in the river that you haven't got in Duluth Harbor, the room to maneuver that we have inside. It is identically what we want—about a mile from the piers, about a mile long, and it gives the shelter. As against the storms coming northeast we have much more in our favor than they have in Lake Michigan. The depth of the water would have something to do with its cost but not in its action. I don't know as it would in its cost, because it may be harder to get stone than with us. Our whole coast is a rock-bound coast, with the best kind of rock for building such a protection as that. Now, that is what we want here in Duluth, in my judgment; a breakwater of that character. Then the vessel can round to, nice hold, if they want to, under that breakwater, and they can wait there for orders or they can await the condition of the weather. And there will be times that they may have to do that will occur very seldom, but at that one time is the time that they need it, and they need it awful bad, and to appreciate that condition it has got to be seen what condition the storms create.

Here is the west end of the lake, illustrating what I would recommend to you gentlemen to try to assist us to get—that breakwater right on that point. We think with that we ought to come in there, and come in there under moderately smooth water in any gale of wind.

Now, the idea may occur to some of you gentlemen that a vessel may come along the north shore in a northeast storm till near the west end of Lake Superior and then go across in the trough of the sea to the Superior entry, which has been approved of to make a good entrance. I think it impossible for a light vessel to do this in a moderately bad storm, and in most storms not safe for a loaded ship of the best to try it in a northeast snowstorm. It is like a man blindfolded going across this room to find a crack in the door. Even if he has his bearings when he starts, it is a question if he finds it till he is in trouble or on the beach.

Now, in addition to the expense in the line of insurance as the sentiment exists now among vessels that come here with their consort left over in Ashland for cargo. They are coming around this way to go to Duluth, which is a very good thing. He comes around to the outside of Apostle Islands, and if it is threatening northeast weather, what is he going to do? He waits here until the weather clears without knowing he is going to have the right kind of protection to come in here. And the loss of time to this class of transportation is important.

Now, in a general way, those are my sentiments.

Here is a record of the northeast storms at the head of the lakes for ten years [presenting the Board with a paper]. I would also like to file with the Board comments of mine made last January, when I was expecting to go to Washington and I could not because of sickness, and the expressions are in there that I would like the Board to accept as expressions made under very careful consideration of the subject.

We have had 200 storms in ten years affecting the inside harbor. Every storm of probably twenty miles velocity will disturb this inner harbor to that extent that it is very severe, and it is expensive to handle cargo. And over 25 miles an hour makes quite a roll of the sea in here. Now, we have had 200 of those in ten years, and we have had forty storms over 45 miles an hour and up to 68 miles an hour, many of them in the sixties and seventies. Now that loss of time in the harbor and the fact that the wholesaling and jobbing and the most valuable part of the trade of the town is in that portion of the harbor, and the expense, and the annoyance, and the damage that is done to docks and the like, is a very large figure and I am sorry I haven't data for that. But it is very important. Until we have some outside protection it will continue, and it is very expensive and it is not fair to us as a people that are growing as fast as we are here, to suffer that. And when you gentlemen consider the enormity of this proposition the question of the cost of a breakwater, where

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we have an endless quantity of stone along the coast and of easy handling to place it where it will make a barrier against the waves, dwindles.

And on that point and the question raised by some—I think, unfairly—that this might be an obstruction to navigation to put a breakwater there, I think it is not fair to consider it that way at all. I think the whole coast from here to the Soo is an obstruction if you run on to it. And so is the whole of Minnesota Point, which is the main breakwater to the harbor. That question of calling it an obstruction was well illustrated here in an investigation that took place in this room a year ago, when all the masters of the fleet in port were before the committee. Not one of them found objections of any strong character against that. I asked relative to the course they would pursue along the north shore. They would say they would be a mile or two off the north shore. If they are off a mile or so passing along the north shore they would be that far out of the breakwater. So the reasoning that the breakwater is an obstruction and dangerous to navigation, is not, I think, fair to be considered.

Northeast storms at Duluth in the ten years 1896 to 1905.

[Submitted by Capt. Alexander McDougall; compiled by H. W. Richardson, U. S. local forecaster, September 15, 1906.]

Months.	Continuous wind velocity of 25 miles or more per hour.					Actual number of northeasters with maximum velocity of 36 miles or more per hour.	Actual number of northeasters with maximum velocity of 40 miles or more per hour.	Highest maximum velocity on record (miles per hour from northeast in 10 years, 1896–1905).
	Total examined.	Average number for each month.	Average duration.	Average wind velocity.	Average maximum velocity.			
			Hours.	*Miles per hour.*	*Miles per hour.*			
January	6	1	9	27	31	2	0	36
February	14	1	9	28	31	5	2	46
March	34	3	17	28	33	19	8	60
April	26	3	15	28	32	12	4	54
May	30	3	14	27	32	14	6	57
June	16	2	23	29	30	9	6	63
July	6	1	6	28	30	3	1	40
August	11	1	8	27	29	1	0	38
September	16	2	13	29	33	6	4	48
October	21	2	9	27	31	9	2	55
November	13	1	11	30	36	7	5	[a] 68
December	7	1	8	27	32	4	2	42
Totals or averages.	200	2	12	28	32	91	40	.....

[a] November 28, 1905.

Taking into consideration wind velocities of 15 to 20 miles or more per hour, northeasters often cover the greater part of two to three days, and sometimes longer; although, as indicated by the foregoing table, the high velocities usually average but twelve hours' duration per storm. There have been numerous departures from the above rule, the most notable exception being the extremely disastrous northeast gale of November 27–28, 1905. In that storm the following averages obtained: 25 miles or more per hour for twenty-nine hours, but the average hourly velocity was actually 42 miles; an average ranging from 50 to 60 miles per hour was maintained for fifteen hours, and of 60 miles per hour for about thirteen hours. Maximum velocities (for five-minute periods) of 66 miles per hour occurred eight times in separate hours and of 68 miles per hour in each of two hours. Of course the actual velocities frequently and considerably exceed the averages shown in the foregoing table as regards individual storms.

The senior member of the Board called upon Mr. W. J. Olcott, who responded as follows:

W. J. OLCOTT. I had no idea when I came here that I was to make any remarks or that I was to be called upon.

This is an intensely interesting question. Everybody at the head of the Lakes, whether as a private citizen or connected with any of the large interests, feels the importance of it. I knew if I came down here a good many arguments would come up and we would get some information. I came therefore as a listener, and did not come prepared to offer any particular suggestions on the solution of this problem. I have not been authorized or requested by the corporations or interests that I represent to come to this meeting, and what few suggestions I can make off-hand will be as a citizen of Duluth and

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covered by the experience I have had in the business connected with the iron-ore production.

When we consider that in 1885, when I started in business, that the total shipment of iron ore from the Lake Superior ports was approximately 2,500,000 tons, and that we intend this year in one month, in July and August, to ship over the Duluth, Mesabi and Northern an equal tonnage, it will show the rapid growth in the short period of the iron business alone.

In 1893 or 1894 the average shipment from our ore docks, the average tonnage of the boats, was 1,809 tons. Last year the average tonnage of all the boats at our docks was very close to 7,000. We shipped 11,220,000 tons. We expect that this year the average tonnage will be 8,000 tons. That in itself shows what the growth has been and what the requirements are.

About 1885 all the ore was going forward in small ore cars that averaged 7 tons. The cars we are using now carry 100,000 capacity. What was adequate for harbor facilities then is not adequate at the present time.

As I look at this problem I don't know enough about it to say which is the right solution, whether a central canal or with the protection of the present canal. People who have full information and who have knowledge of harbor improvements are the proper people to decide. I do know, however, that we need something. Duluth has grown, as I have indicated, in the last twelve years, at an enormous rate, and we feel that we have just started. We are not only a large shipping port, but we are going to be a larger one. We are not going to be simply a shipping port, but we are going to be a large manufacturing port.

When first the question of producing steel was agitated here several years ago, everybody in the East said you couldn't make it, there wasn't any market for it, and if you did produce it, it would have a market that would be small and you couldn't produce it in competition with Pennsylvania and Ohio.

Careful examination by steel experts has shown that they can produce pig iron and steel in Duluth at a handsome profit. We have an advantage in shipping to the West over the eastern markets. Therefore, this harbor is not important only as a shipping port, but it is also as a manufacturing port. The business has not reached its ultimate capacity, but we feel that it is going to increase from year to year.

Therefore what we want is not a makeshift. We don't want a little pier stuck out in front here that is going to take care of the business of two or three years. And I do not think it would be wise for the United States to spend their money that way. We should look forward to see what is going to be required and what will be adequate in the future and for many years to come. If it is feasible to have a breakwater out there, we should have a breakwater that in fifteen or twenty years, or forty years, is going to take care of this harbor. I do not believe the people of Duluth want any little breakwater out there that is only going to run out a short distance and not going to accomplish what we want.

If the Board of Engineers, who are the most competent to judge of those matters, should decide that a long breakwater protecting this entrance canal would allow boats to enter this harbor in safety, it seems to me that is the thing to have. If it is not going to accomplish this, we should not spend the money. If the central canal is not a safe project and is not the best, I do not think the people and I do not think the corporations representing the shipping interests want it. That is a question for the people to decide who are looking after these matters, who have had years of experience in harbor improvements.

There has been a great deal of difference of opinion at the head of the lakes. It has been pretty hard to get unanimous opinion. And that is not to be wondered at. It is a good deal of a problem in engineering and hydraulics and in navigation to decide just what will be the results of these different plans, either of the breakwater or the opening up of a central canal, but whatever improvement is made should be made advisedly and after most careful study.

We, however, who were on the shore here last November and witnessed this sad disaster of a boat coming within a few hundred feet of the shore with people on it and those on shore being unable to render any assistance, feel that something should be done to prevent that occurrence again.

I think everybody feels satisfied that the people in Washington and the Engineering Board are fully alive to this situation. They have indicated it by taking the time to come here right on the ground to see the actual situation. And I believe that after the matter is gone into thoroughly we will have an improvement at Duluth which will be satisfactory to all parties.

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The senior member of the Board called upon Capt. A. B. Wolvin, who responded as follows:

Capt. A. B. WOLVIN. Like Mr. Olcott, I didn't know I was going to be called upon.

My observation would be this: Duluth here has the finest breakwater that was ever built. Minnesota Point affords perhaps the best possible protection to Duluth Harbor. I have talked with engineers—not with this Board—who have frequently made the statement that all that was wanted was some easy means of ingress and egress to this harbor through Minnesota Point.

As a sailor—and I sailed on the Lakes quite a number of years—as a handler and having charge of large fleets of vessels, and after long study of the situation, going back to a time before the War Department made this last improvement in these piers, I am firmly convinced in my own mind that the remedy, the solution of this whole question, the improvement which should be carefully looked into, is the central canal.

First. For the reason that you already have a breakwater provided with an opening so that a vessel can go through it unrestricted in either direction.

Second. Anything in the way of a breakwater built off the north shore of Lake Superior is an artificial reef, and you can't get away from it.

Hence it has always occurred to me as an unwise policy to spend money to artificially put something in the way of a free and easy access to this port. The bad weather is to be included in all the calculations. The breakwater during a snowstorm such as we frequently experience would be as useless as anything you could imagine from the standpoint of the man operating the vessel approaching Duluth. He couldn't find it—exactly as he does to-day when the weather is bad, which I have done many times in my experience, and as Captain McDougall has also done. He and I were contemporaries here in the vessel business—that is, in the active business on board ship. I believe that the Captain (McDougall) stated that many times approaching the port of Duluth when the weather was bad, blinding snowstorm prevailing, and all that, there is nothing to do but turn your vessel around and go down the lake. That you have got to do to-day. If the vessel has power enough to turn against the weather conditions, you turn around and go back all right; if she has not, she has got to cross the breakwater that won't do any good under those conditions. You can't find it any more than you can find Duluth piers.

Granting that you have a breakwater built down here—I don't care where—every vessel man approaching this harbor would be as fearful of the breakwater in bad weather—as fearful of hitting it—as he would be of trying to find Duluth piers. If, again, you have the breakwater, how large must the area be? Where would you have to build the breakwater to provide room for the enormous number of vessels that come to this port?

Now, it is all right to talk about a breakwater a mile or 2 miles down the shore. Captain McDougall, every practical vessel man knows, by the time you get half a dozen vessels scattered in there that the conditions for the seventh vessel trying to turn around and get in there would be fraught with a good deal of danger, particularly in the night.

The conditions here are different from any other port on the Lakes, as Captain McDougall has said. Take any other breakwater except one, and that is Buffalo, you get to where you know it is close at hand. Perhaps you can't see it. Put the wheel up or put the wheel down and go by it. You have got sea room. You have got some room to go.

At Chicago, Cleveland, Ashtabula, Fairport, Erie, if the vessel approaches those breakwaters and don't like the conditions she can go down alongshore. But here the conditions are different, indeed. You are at the end, like Buffalo. You can go no farther. The prevailing wind here is northeast, the only wind from which you seek shelter, of course. And it blows hard. It takes a vast amount of force to turn these big steamers of to-day where they lie. In fact, we have had our own experience with our own men who were out in the lake two years ago. I know of my own experience that 2 miles is not any too much room in which to turn these vessels, and many times they won't come head to at all. That is the difficulty we have to contend with. Hence, I say, the idea of finding room, providing room under a breakwater for the accumulation of the fleet that comes to this port is a matter of a good deal of doubt in my mind, and on account of the fact that it takes so much room to handle these vessels, unloaded, in gales of wind.

I have seen one of the men here, one of the captains of the steel corporation who was in the storm a year ago in November, and I think I heard something of his experience.

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Now, from the standpoint of the central canal. I have been an advocate of that canal or central opening, as I was for a good many years. Anyone can find the opening to that central canal coming to the head of the lake with a steamer as readily as he can find the breakwater in a snowstorm. If he finds it there he is all the better off when he is through the opening. When he finds the opening he knows that inside he has more water, he can handle his vessel, he can go to the north pier at Duluth or go to the south pier at Superior. There is lots of room.

The central canal could be protected, no doubt, as readily as any of those other piers, either Superior or Duluth, and the one institution would do the service for both ports.

From the standpoint of the vessels—and breakwaters and all that sort of thing, as I understand it, are built in the interests of the vessels—the saving in time of the operation of this fleet, 90 per cent of the capacity of which is ore that is east bound, by reason of a central canal, is considerable. That is true of east-bound commodities as well as west-bound commodities.

The argument against the central canal from the standpoint of the representatives of these two ore-shipping docks is this: First, as far as Superior is concerned it would be a disadvantage to the vessel going through the central canal rather than down to old town and through the piers there. The facts are that a great proportion of the tonnage, which is almost impossible to find out, but as the operator of that tonnage for several years I can say the greater portion of that tonnage comes to Duluth side for orders.

It is there dispatched to Allouez Bay dock. And then again, the large number of coal cargoes that come here. As soon as the vessel is discharged they go down the inner channel anyway and to the Mesabe dock—doing practically twice as much business. There is a dock at Allouez Bay, and being no hardship to the vessel going to Allouez Bay, I make the claim that, as far as ore transportation is concerned, the vessels would be very much benefited, indeed, by reason of a central canal. The same is true of every other commodity that is handled at the head of the lake, except what might come locally to these several docks right here in this corner of this building. And by the way, for six or seven weeks in the year it is quite impossible for vessels to lay at these docks and handle cargo nowadays without undue effort. Sometimes they have to leave them entirely.

From the standpoint of the vessel, as I see it, the central canal is clearly the improvement that should be carefully and seriously considered.

SENIOR MEMBER OF THE BOARD. Do you propose to close the Duluth entrance?

Captain WOLVIN. There is no necessity for it.

Now, a question was brought up here a moment ago—the cesspool. That is obviously absurd.

Suppose the canal was filled to 14 or 15 feet. Above it would be ample room for drainage, and would do away with all this difficulty that now confronts us here, that we now experience from the winds from the northeast, and that is our prevailing wind here. No; I would not consider a moment filling either canal as they now exist. I think it would be a mistake.

SENIOR MEMBER OF THE BOARD. Then what protection do you propose for these Duluth docks from Duluth entrance?

Captain WOLVIN. I think if this canal, for instance, were shoaled up—I hardly know to what depth—you could shoal it considerably as compared with the depth to-day and still have an inlet and outlet for water, which would keep this end of the bay always fresh.

SENIOR MEMBER OF THE BOARD. You mean, then, to close it as far as navigation is concerned for deep-draft vessels?

Captain WOLVIN. Yes; I would close it for large vessels, 20 feet. Shoal it up to 10 or 12 feet, or such a matter. I don't think you would have any trouble inside then. You would break the sea.

The senior member of the Board called upon Mr. L. H. Harris, who responded as follows:

L. H. HARRIS. Mr. President and gentlemen, I undrestand this committee is appointed by an act of Congress to consider ways and means for improving the conditions in the Duluth Harbor. It seems to me that not only in the Duluth Harbor, but also proper for the safety of entrance of vessels into Duluth Harbor.

And it seems to me that this involves the consideration of four questions—the situation outside the harbor, the situation inside of the harbor, and the remedy and the cost.

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Now, as to the situation outside of the harbor.

I can not say much more than to merely emphasize what has been said already upon any of the questions, much more than to emphasize what has been said by Captain McDougall, and also by Captain Wolvin and by these gentlemen who have had practical experience along that line.

While the people of Duluth are not experienced either as marine men or as engineers, still they can see what the situation has been here by actual observation. A layman can not explain that. He can see the difficulties that we encounter here and the dangers because they are apparent. He can see those as well as a technical man can.

Now, as to the situation outside of the harbor. A map will show that the distance from here to the Soo, which is the extent of Lake Superior, is 400 miles in length and its general direction is northeast. That is also the direction of the prevailing winds during a large part of the season of navigation. Those winds, as it has already been testified to, are at times of great velocity; and this lake, as every one knows, is a lake of very great depth. When you have that sweep of 400 miles for these winds to come down, and we are here in a narrow pocket, the average width of the lake being from 80 to 100 miles, and here at this end of it only about 10 miles, you can imagine what the situation is after a three or four days' blow in a strong northeast wind, and that is generally the length of time that these winds prevail at this end of the lake at the end of one of those severe storms.

We also have another situation, and that is when these winds continue for such a length of time the inside harbor fills up rapidly with water, and as it rises there is a conflict arising between the water in the harbor attempting to get out and the waves coming in, and the action of the waves and the current running out create a very serious situation that would not be so dangerous if one of them could be eliminated. The current running out could be contended with if the vessel men could have quiet water at the immediate approach of the harbor. But these storms are severe. They have been severe in recent times, and there is no reason that we can depend upon for their ceasing in the future. There is nothing by which we can judge that weather conditions are going to change and that these storms will at any time abate.

The situation inside the harbor is also to be taken into consideration. There are two elements that enter here, and they are the destruction of property inside the harbor and the difficulty or delay that is caused to vessels by the agitation of the water from loading or unloading.

Now, as to the destruction of property. The men who are the owners of docks and wharves and elevators here and mills will tell you that in every year there is considerable destruction of property here. One argument that I have heard advanced is that it is not within the province of the Government to make appropriations to protect private property. That is true, in a certain sense, but that would not apply to docks and wharves, because docks and wharves are one of the elements that enter into navigation and into commerce, just as much as the vessel is.

The Government does not make direct appropriations for building vessels, but it does make appropriations for light-houses and for deepening channels and all of those things which are an aid to navigation and to commerce. Now, docks and wharves are just as much an instrumentality of commerce as vessels are, and it is perfectly proper, I think, for the Government to take into consideration the remedying of a situation which will make it safer and more economical for the protection of docks and wharves as much as it is for vessels, because that is one of the instrumentalities of commerce. It would be of no avail for vessels to come into this harbor with their cargoes if they did not have docks and wharves at which to land, at which to load, and at which to unload. And so it seems to me that this is one of the things that it is perfectly proper for the Government to take into consideration in considering the situation.

Then, as to the remedy for such a situation as this. It is conceded that there ought to be some remedy for it. Now, the great majority and, I think, practically all of the people at Duluth, unless it is Captain Wolvin and a few others, are in favor of a breakwater, and they think that that is the only thing that will remedy the situation. It is certainly the only suggestion that has been made that will remedy the situation—the breakwater.

As to the cost of that breakwater—and, of course, that is an element that has got to be taken into consideration to a certain extent. I am not advised as to the cost, but Captain Darling, who was a member of the local board, has, as

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I understand it, drawn the plans for a breakwater and can inform the Board, and I hope that he will be called upon before this meeting is over to give his ideas upon that breakwater.

So far as the breakwater being feasible and as to its being a danger to navigation, it seems to me that that is magnified. All harbors, unless they are natural harbors, have breakwaters, and it is necessary to have breakwaters, and how the breakwater can be any more a menace than the shore, especially as it will have a light-house upon it at the end, supplied with fog whistles and things of that kind, I can not understand. I can not understand how that will be any more a menace to navigation than the shore itself will be a menace to navigation.

Now, as to the cost of it. Captain McDougal has shown—and I think that Major Darling has gone into that question to a greater extent—as to the things that a breakwater here would overcome in the way of cost. We all know that the consumer ultimately pays all things. All things are referred back onto him.

If commerce is unsafe and it is dangerous to navigate vessels under certain conditions, why, that is taken into consideration in levying the cost of the transportation, and all of those things ultimately find their way into and are paid by the consumer. Now, if these dangers which we all know exist here can be overcome it is only reasonable to suppose that according to the laws of trade they will ultimately find their way in a reduction of the present charges and in that way it is an indirect aid to navigation. As Captain McDougal has well said, if this breakwater should cost four or five millions, even with the present tonnage that comes in here it would only mean a few cents a ton to take care of the entire cost of this construction.

There is another element to be taken into consideration, and that is not only the element of property, but the safety to life, the sense of security that the navigators would have. We have known in times past that a great many vessels that have come into Duluth port have come with their sailors in life-preservers as they approached the port. We all know, and it is useless to discuss that question, that there is danger in approaching this port. It has not only been in one storm, but it has been in several. And there is this other thing to be taken into consideration, that danger is bound to increase with the increase of tonnage itself, with the multiplication of vessels. The danger is becoming much more apparent and imminent. Take the situation that we had here last spring. I think I am entirely correct in saying that within two months there was one day when there were over 60 vessels that entered Duluth Harbor within twenty-four hours, most of them vessels from 400 to 600 feet in length.

Suppose that one of those 60 vessels coming in here inside of twenty-four hours should, as several vessels have done in the past, strike on the end of the piers out there or should strike the bottom of the canal and go down there, and the other vessels coming in here with no means of warning them, coming along in a string! Why, it is very easy and it is not a fanciful objection, that you might have a situation there within twenty-four hours where enough property would be destroyed to pay for the entire cost of the construction of this proposed breakwater. Suppose one of the first vessels coming in, when they are coming in in a northeast storm, did strike the pier there and sunk there at the end of the canal. The other vessels coming along know nothing about the situation, or even if they did learn of it they can't enter the canal; they have got to run on to the shore or they will run on to the obstruction, and you might have a dozen, fifteen, or twenty vessels all piled up there, whereas if you had a breakwater they could be warned of the situation at the canal and they could run around the breakwater.

Now, just a word or two, although I had not proposed mentioning the central canal, but just a word or two in regard to the suggestions that have been thrown out by Captain Wolvin.

In the first place, Captain Wolvin says that the breakwater extending from the north shore would be a menace and that it would be just as easy, as I understood him, to find the end of the present piers as it would be to find the breakwater. Why, it seems to me that this is mathematically untrue. The piers down here are 300 feet wide. In order to get within those piers the vessel has got to come within a certain 300 feet. The distance of this breakwater proposed by Major Darling is 1½ miles, and it seems to me it is much easier for a vessel to come behind a breakwater where they have got 1½ miles within which to navigate than it is to come into piers that are only 300 feet in width.

Furthermore, the way this breakwater is proposed to be constructed, although it runs out beyond the end of the canal, the vessels would not have to run

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squarely behind it. We all know from the situation of the lake here that a vessel would come in quartering this way, and the first thing you know the vessel would be behind the breakwater without making a turn at all. All the vessels would have to do, it seems to me, would be to change their course from the present course and instead of coming as they do now they could direct their course a mile or two farther south and then come in in a general northeast direction, and they would run behind the breakwater without making any turn at all, but simply come in on the general course of the lake. And certainly when they got behind the breakwater there would be ample protection.

Now, another thing on the suggestion of Captain Wolvin, and that is, if we built the central canal wouldn't you have to have a breakwater to protect that, especially as I understand that under that plan he proposes a wide canal, so it would be safe to enter? At the Detroit meeting he placed the entrance at from 600 to 1,000 feet in width. If you had that size you certainly would have to have a breakwater to protect the inner harbor. He said himself there is at the present time from six to eight weeks in a year when you can't load and unload vessels by reason of the action of the water that comes through the present narrow canal, which is only 300 feet in width.

If you have a central canal there is just as much water going to come through the central canal and if it is double the width of the present canal there will be much more water come through it. If you have a central canal and no breakwater then you have got the same situation, at least inside of the harbor, that you have at the present time. If it is wider you have got a worse situation. If it is narrower you have got the same dangers for vessels in entering that you have at the present time. If you put a breakwater in front of the central canal I can not see why that breakwater would not be just as much a menace to navigation as the breakwater that is proposed from the north shore. So that it seems to me, whichever way you take that proposition, there is nothing in the proposition of the central canal which remedies the situation either from the outside or from the inside of the harbor at the present time.

Now, the cost of course seems large. You can't get something valuable for nothing. That should not be considered from the mere present standpoint at all. And I think that the Board should give careful consideration to the remarks of Mr. Olcott, who is in a situation to judge of the future as well as any man in the city of Duluth as to the increase of commerce. We have what seems a most stupendous commerce here at the present time. This Board was around this harbor yesterday and saw something of the situation that is going on here now in a business way, and probably this Board has but a very slight conception of the conditions of Duluth, which are the real conditions that make business here, and that of the immediate country around here. This country is at the present time but very sparsely settled. It is not doing one-fourth of the business that it will be doing in the next twenty-five years, and Duluth is the natural headquarters for all that business.

The tonnage in the Duluth Harbor has probably for a great many years got to go on increasing in the same proportion that it has in the past ten or fifteen years, and all of those things should be taken into consideration in considering the question of cost that the Government would be warranted in expending in giving a perfectly safe harbor. It seems to me that considering the additional safety that would be given to vessels upon entering the harbor, because, if they once get around that breakwater no one will deny but it will be perfectly safe entering this harbor at the present time, considering the probable reduction in the cost of transportation and the cost of insurance, considering the additional safety to the lives of sailors and navigators and considering the convenience to the business interests of the harbor, the obviating of the delays that are now attendant upon vessels being unable to load and unload during the periods of high storms, considering the question of the reduced cost of the maintenance of docks and wharves which are instrumentalities of commerce inside of the harbor, when you take all those things into consideration and when you consider the vast amount of commerce that the Duluth Harbor accommodates and that that commerce has not yet reached one-half of its proportions and probably not a quarter, it seems to me that the element of cost dwindles largely under all of those considerations.

The senior member of the Board called upon Captain Flynn, who responded that he did not know as he cared to say anything at this time.

The senior member of the Board called upon Captain Monaghan, who responded as follows:

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Capt. JOHN MONAGHAN. Mr. Chairman and Gentlemen, in regard to the improvement proposed in Duluth, protection of its harbor, I would think that a breakwater from the north shore, outlined in the argument of Captain McDougall, would be the proper thing to protect the lives of the sailors and passengers, as well as a protection for the docks and wharves inside. I can not see where the menace to navigation would come in, when the breakwater is extended only about a mile or a mile and a quarter out from the north shore. There are very few, if any, vessels that will shape a course that close to the shore, either going up or coming down the north shore. They will always be out at least 1½ miles, and from that to 2½ miles. A breakwater, therefore, is not in their way, and it is an ample protection, as proposed, when they come up here, for some place to come in. Make smooth water, and a boat can come into the piers.

And in regard to the canal being cut down in the center of the point, I would think that the opening of another channel through there would be a wrong thing to do. It would let the sea roll into the harbor inside, if it were not protected. The same conditions would exist with the piers that would be put there as exists at the present piers at Duluth at the present time.

I agree with what Captain McDougall has said here in every way. I can not see really anything to do better than the way it is outlined by him.

I had occasion to reply to a letter which was addressed to me on that subject last year when the matter was talked over here, and I expressed my views at that time in the letter, and if the Board would like to have that I will see that a copy of it is furnished to them.

The SENIOR MEMBER OF THE BOARD. We would be glad to have you furnish it.

The senior member of the Board called upon Ernest Jefferson and received no response, he not being present.

The senior member of the Board then called upon Mr. T. W. Hugo, who responded as follows:

Mr. T. W. HUGO. Mr. Chairman, I have not had the great pleasure of standing in the front of a boat trying to get into a harbor, but I have been very anxious sometimes about whether the fellow in front of the boat would make the proper entrance. I have been keenly anxious to know what that fellow has been doing up in front, so my experience along the line of finding an entrance has been different from those who have already spoken, but I have felt it, as all other men aboard the boat do feel it.

I know this much, that we would be very much better satisfied coming down the north shore of Lake Superior with the knowledge that we are going to bump up against a breakwater with a light-house on it, or some way of sliding down the north shore and then taking our chances of getting in Duluth Harbor, than we would by striking out and having nothing to feel our way down and looking forward to a central canal.

I should like to have the facility and ability of Captain Wolvin, with a smile and graceful wave of the hand, to put to one side all the interests inside the harbor. But otherwise, except the suggestion came from him, I should be inclined to think that the central canal, as strongly as he favors it, to me would be a piece of the most monumental folly that was ever conceived or placed before the people of the city of Duluth.

The volume of water running in there, under any circumstances, meeting the current of water coming down St. Louis River in that place now where at the present time, without any break there—the current is such that even a small tug finds very heavy waves in making its way in a small wind; and it would seem to me that the maelstrom of which we have read would be but a miniature of the difficulties and the conditions which would then prevail under any circumstances, whether there was an outside breakwater or not, merely the fact of having a hole through there for the water to come through. It would not relieve the conditions inside the harbor; it would intensify them.

The business inside here, all around, which has been belittled, is the busy, valuable portion of our harbor, both sides. We are not all iron ore, nor do we all have it in our pockets. There are other things besides that to be taken into consideration.

The contention also that time is saved is not based on facts. I will have to ask Mr. Darling to confirm that. I understand from Mr. Darling, from private conversations, which he will probably confirm, that from a detailed investigation of the difference in time between a boat entering the central canal, if there was one, and those entering the other canals is in favor of the two other

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canals. That I am willing to be corrected upon, if it is not so. So that that argument does not prevail.

Now, the destruction of property, which is a serious one, especially to the grain interests here, and not only the destruction of property itself, but also the delays. I know that since the last storm, of which we have spoken, the Consolidated Elevator Company has not yet fully repaired the damage caused at that time. And I wouldn't want to tell you how many thousands of dollars it cost them besides the delays, not to say anything of the property all along this front here, the other commercial outlets of the shipping, the docks, etc.

Before the present canal was enlarged the effect of the seas running in there didn't extend much beyond the slip between the Ohio coal dock and the Consolidated Elevator Company, beginning with B, D. C. and G. Now, however, it has extended beyond that. It goes beyond elevator I; it goes into the angle which is made by elevator F and elevator I, where the seas come in there together and cause a rise of 15 and 20 feet. I had a small launch that I used to anchor at the other side of "I" in perfect safety for years before the new canal was made. At the present time you could hardly anchor a tug boat and have her keep above water in the same place. So the influence of the widening and the deepening of this canal here can hardly be imagined except you have seen the results of it. Now, if that be the case, with 50 feet more and a few more feet added to the depth of this water, what can you expect with a central canal meeting the volume of water coming rapidly down St. Louis River, right where the bridges are, right where you want to have perfectly still water, if you want it anywhere? The conditions, it seems to me that would then prevail would be most disastrous as affecting the property on either side in the vicinity of the central canal, or wherever it may be placed.

I have been here in Duluth for twenty-six years, watched the development of the city, have in some measure been acquainted with the growth of its commerce, and I do not want to have it said, or even thought, that the entire future of this city depends either on the iron industry or what is done in favor of it, or even for shipping. There are other things besides boats and besides iron-ore cars to be taken into consideration. And I think—I know—that this commission will take the broad view of this whole matter, that Duluth is bigger than either of those interests, and is bigger than any other single interest, and that Duluth, as a whole, is in favor of the breakwater.

Capt. A. B. WOLVIN. Mr. Chairman, I have been pointed out as the representative of the so-called "monumental folly," and I would like the privilege of making just a few more statements, if I may have it.

It is a fact that there doesn't seem to be anybody else here for the central canal; hence I assume that Mr. Hugo is right. I presented the "folly." Perhaps I am a fool.

I would like to ask Mr. Darling one question or two, simply to bear out the statement of saving the time in the operation of vessels going through the interstate bridge up through the central canal as compared with the Duluth.

Will you kindly give me the distance from the piers here around up through the interstate bridge?

Mr. DARLING. The distance is about 2½ miles. The saving in distance would be about 1⅛ miles, 1.3, from the central canal to the interstate bridge as compared with the distance from the Duluth canal to the interstate bridge.

Capt. A. B. WOLVIN. I will leave it to Mr. Hugo if it is not true that without any offset a saving of 1⅛ miles would be some saving of time.

Mr. T. W. HUGO. Surely.

Captain WOLVIN. Then the vessel has got to fool away a good many times with ferryboats, small boats, all classes of boats; they are always more or less in evidence in this channel over here across the bay, whereas in going straight out to sea they would avoid all possibilities of meeting with all classes of traffic. Isn't that right? Wouldn't that vessel go even faster than she would come through the Duluth channel? Wouldn't she navigate this channel from the interstate bridge at a more rapid rate through the central canal than through this way and meeting all this system of commerce going through the present piers of the Duluth channel?

Mr. T. W. HUGO. I do not believe it would make much difference to the fellow on the front. He would go ahead just at his speed.

Mr. DARLING. Excuse me a moment. It is hard to stop with that one question in regard to the saving, because, take the commerce down at the other end of the bay and there is an increased distance amounting to about 3 to 4 miles,

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4.4 miles down to the ore docks at Allouez Bay, comparing the Central canal with that of the present Superior entrance.

Captain WOLVIN. That is true. I included in the former statement that there would be a disadvantage to the ore dock at Allouez Bay. But when you come to consider the vessel standpoint, I don't know that it is possible to figure out what percentage of vessels do come here for orders.

I would say for three years here I was in charge of the operation of the steel corporation fleet—all the vessels that carried iron ore; organized their lake service—and I know at that time nine-tenths of the vessels came to Duluth for orders. Those that went to Allouez Bay dock came to Duluth for orders. And I presume the same rule prevails to-day. Mr. Brown, their representative, will readily tell you if that is the case. I believe it is so. Hence, coming through a central canal there, the average on the whole would be a great gain in saving the time for vessels going to Allouez Bay dock. There are very few vessels that come here light for ore that go direct to the dock. They come to Duluth instead for orders. And I presume that will always be the case as long as the vast proportion of the shipments of Allouez Bay dock are controled here at the office of the steel corporation. That is the point I wish to make.

The SENIOR MEMBER OF THE BOARD. Captain Wolvin, the members of the Board have expressed the desire to hear people familiar with the navigation of the lake. You mentioned one captain present and you were going to give us a chance to hear him. We will take him when you are through.

Captain WOLVIN. Yes; I see him here now.

Capt. JAMES LEISK. Mr. Chairman, I did not come here to speak, but I am glad I came here, and in other ways I am sorry. In the first place, I am sorry to think to-day that I represent a steamboat that is worth $460,000 or $470,000, and here is an old sailor, captain, sitting here to tell me I don't know enough to come into Duluth Harbor. If one man gets in trouble in the piers here he don't know enough to blow an alarm signal to the man that is following him, which is one of the rules laid down. The first thing when we get in trouble in any channel, and there is a steamboat following us, is to give an alarm signal, which is, as I understand, four or more blasts.

As far as coming into Duluth is concerned, we come here and we go out, and I would like to see the time myself when there was some other way of coming into it than at the present time. I don't know whether a breakwater will be the best or the central canal. That is something that probably future generations will find out, but I don't think we know at the present time. But in operation there is one thing sure and certain, that the central canal is better for us than the Duluth piers is to-day. I come in here, I think, three trips ago now, two or three. I had to go to Allouez Bay. It was blowing a gale of wind from the northeast at the time. It was on a Saturday afternoon. And in going across there I violated all the laws of Duluth Harbor which are laid down to me. I had to do it in order to keep my ship afloat, to keep her from going across to the other side. And we got over there. We had to let go both anchors. We couldn't stay then at the dock at Allouez Bay. I had a tug ahead. We had to let go both anchors and lay to and anchor out there. Later on I got another tug and went down to get in there. And when we come in through here we look and see all the docks that is being built on the other side all through the bay, why, it looks to me to-day that the central canal is the place.

Of course Duluth people want something. That is all right. I don't know anything about Duluth. I am not talking Duluth. I am talking from my own standpoint, navigating a ship safely in a gale of wind. Captain McDougall says there is not as many snowstorms now as there used to be—for the very reason that Captain McDougall goes to bed at night. He is not standing on the bridge. They are just as thick this year and last as they were before. We had lots of them last winter, and fortunately Captain McDougall has got over standing on the bridge. I am glad of it. I wish I was, too. I don't know just how far out that breakwater is going to be. If we have got a chart here, I would like to see it. This is the first time I have ever been before a Board, and I don't know anything at all about it. And I don't know where the breakwater is, and I would like to know how far out I have got to come, and then I can tell you whether I can make that with a 600-foot boat or not.

Captain Leisk then made an explanation to the Board, using the chart, contending that it would be hard to come in past a breakwater with a long ship and then to enter the canal. It would be hard to come around the end of the breakwater and then come into the canal.

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ONE OF THE MEMBERS OF THE BOARD. I understand most of these big ships come up light. If you have a 45-mile gale with your light ship, wouldn't it trouble you almost as much as the sea?

Captain LEISK. Yes, sir.

ONE OF THE MEMBERS OF THE BOARD. In other words, the element of smooth water is not so absolutely essential; it is the wind and the waves together?

Captain LEISK. The wind and waves together.

The senior member of the Board called upon Mr. W. A. McGonagle, who responded as follows:

Mr. W. A. MCGONAGLE. Mr. Chairman and gentlemen, any remarks I make are of a personal character and as a citizen of the city of Duluth.

I was educated as a civil engineer. I have been in charge of large works—for twenty years in charge of the construction and design of the ore docks at Two Habors. Since that I have been in direct charge of the operations of the ore docks at Duluth. I state this to give the Board some idea as to the experience I have had in past years.

My opinion on this subject, after careful consideration, is that the true remedy is a breakwater, built substantially as designed by Mr. Darling.

We are confronting actual conditions in the city of Duluth. We know that the inside property has been destroyed and seriously damaged. The question that I understand this Board is here to decide is, What is the best remedy to apply to correct these conditions?

The Government, after mature consideration and the expenditure of a million dollars, has put up what we believe to be an ideal pair of concrete piers forming an entrance to this harbor. The city of Duluth has, at large expenditure, built an aerial bridge costing over $100,000.

It would seem to me absurd to throw away all this expenditure and to acknowledge that the Board of Engineers who were responsible for the present improvements did not realize the conditions existing in the city of Duluth and did not know how to build a safe entrance to this harbor.

I believe that the engineers who designed this entrance were competent men. I believe they did the best they could with the appropriation at their command. and I believe that the thing now to do is to place a breakwater, which will correct the evil at the least expenditure of money.

The central-canal idea will certainly call for an enormous appropriation. You will not only be required to build the concrete piers, but after those piers are constructed you will have the identical problem facing you that you have at this moment—that is, the protection of that canal. A substantial breakwater to protect the 1,000-foot channel would, in my opinion, cost several times as much as the necessary breakwater to protect the present entrance to this harbor, and it would be a serious menace to navigation, because it would be in the direct line of the approach of vessels to this harbor, whereas the breakwater proposed now has been admitted by the navigators to be out of the line of approach of the vessels. This testimony has been given to the Board, that a vessel usually stands out from 1½ miles to 2½ miles from the shore line. That is beyond the reach of the present breakwater.

I am therefore of the opinion that as a business proposition this Board can reasonably recommend that the expenditure already made be protected by a reasonable expenditure for a suitable breakwater.

Now, I do not believe that $5,000,000 is an unreasonable appropriation for protecting the great business interests of this city. We know what it is. The statistics in charge of the Government engineer are all before the Board and are before the citizens of this city. It is not necessary to go through all those details again. But we should sit down, as business men and as engineers, to find out the cause of the trouble and to remedy that condition, as I stated before, at a reasonable expense.

I believe that the central canal, with the 1,000-foot opening, and unprotected from the sea end, would make it impossible for vessels to lie at any of the docks, either in the Duluth harbor basin or in the rear harbor beyond Rices Point.

I know from personal experience that during the storm in November of two years ago the embankment of the Northern Pacific Railway, in the vicinity of the Mesabe docks, was washed out to such an extent that the tracks could not be operated. This was with the small opening at the Duluth side and with the necessity of the accumulated water passing around the end of Rices Point, through the interstate bridge opening, and to the point to which I have referred.

I believe the trouble would be multiplied many times if this central canal was opened up and unprotected, and until some feasible plan is advanced by those

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who favor the central canal and some rational safeguard proposed for the entrance to this proposed canal, I am positively opposed to that form of construction. I am, as I have said before, in favor of the Twentieth avenue breakwater. All of the business interests of Duluth and Superior have united on this proposition. And I believe that when the Lake Carriers' Association and all the vessel interests sit down and reason together we can all agree on putting in this protection to the Duluth harbor now, and if hereafter it is found not to be of sufficient character or protection to meet the then conditions, that we can all unite with the Lake Carriers' Association, and with any other vessel association, and try to get something that will meet the conditions when those conditions occur.

The senior member of the Board then called upon Mr. F. E. House, who, not being present, did not respond.

The senior member of the Board called upon Mr. J. H. Whitely, who responded as follows:

Mr. WHITELY. Mr. Chairman, gentlemen of the Board: Perhaps it is as well that I should say, by way of introduction, that I am not a vessel man or anything more than a lawyer, and one of the least of these, my brethren, but I have studied these local conditions for the last fifteen years, have spent several summers on Park Point, and was there some years ago when I read in the paper Captain Wolvin's suggestion that a central canal would be better than the present one. The piers were then being built. That was before the bridge was built. He advocated it at that time, and it struck me as being the same thing that it has been described here—a piece of monumental folly. I looked the situation over and it grew upon me and I became converted to the central canal.

Now, I must bow with the greatest respect to such engineers as have spoken here—Mr. Darling and others—in favor of the breakwater on the north shore of the present canal; but as a layman I can speak to you and point out some considerations apart from those which I think are well worthy of your serious consideration.

First, the best argument in favor of the central canal is the map. The topography of this city at the head of the lakes is very peculiar. The lake is cut off here by a most wonderful breakwater, a natural one, Park Point. That is repeated again at Rices and Connors points and others of a similar nature, and the others occur up the river and in smaller points. Now, the proposition here is to go out at Twentieth avenue and start another one, make another harbor, or, at least, start one. Now, we can carry that breakwater across from the north shore to the south and make another harbor, and I should not much wonder if it might be done some time in future years, but it is merely a repetition of these points.

Here is a city set upon a hill and upon solid rock, and the rock runs right down to the water front. What are the needs of Duluth and of Duluth commerce? We are very short of ground for terminals. Rices Point makes an excellent terminal ground, and it is well occupied now by elevators and railroad terminals. Here nature laid out a strip of land some several blocks wide, which by nature is really intended for commerce, not for a park or anything of that kind. By moving this canal south, opposite the interstate bridge, we can practically reclaim something like 1,000 acres. I am speaking very loosely on that. Mr. Darling can figure that up and calculate the number of acres between the established dock line on both sides of the point. I have figured it something between 700 and 1,000 acres.

This is greatly needed for Duluth's commerce, because it is going to be very badly crowded. Practically every means of getting a railroad into this city has been used, and the last railroad has come in here at an enormous expense, some $3,000,000, and is tunneling into the solid rock to get in. Now, there is one way of getting off to the east to Chicago and New York, and doing it quickly, and if we could have a railroad down over that point, that is the surest and the most direct route east. Duluth is greatly dependent on bridges, and those bridges are continually breaking down. How many of them are out of commission to-day or were night before last when the big storm came on?

I have said that this bridge, of which we are very proud, is nothing but a toy. That is all it is, when we are speaking of commerce. That bridge will never accommodate the people of Park Point. It is liable to get out of order at any time. Suppose the Brooklyn Bridge should be closed for an hour. The effect of it might be felt all over the country. The traffic here is light at the present time. The bridge has not missed a trip for a year, to be sure,

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but the other night something went wrong, and it was out of commission quite a while. The result is you will not get any commercial interests across that canal on to that point until some better means of approach is provided.

Now, I would propose the central canal, the bridging of this canal with a solid bridge, a railroad bridge, something that will do, or several bridges, perhaps, at each street; make it high enough so that light-draft boats can go under it; strong enough for railroad trains and all kinds of traffic, so they can go over it; then you will have better Point intercourse with wholesale houses of all descriptions, elevators, and high buildings, and the United States will utilize those buildings as one of the best wind-breaks that can be provided. Move it down, say, a couple of miles, and it will provide you the very best protection for the inner harbor.

It was suggested that the ore docks were badly injured by the November storm of two years ago. Now, a large degree of that lashing of the waves arose inside of the harbor with the wind that we had at that time. Take the Marshall-Wells Building there to-day. It is a most excellent wind-break for the inner harbor, so far as it goes. Build such buildings on down there for 2 miles, we will say, and you will have the best possible protection for the inner harbor.

We will have a breakwater for the central canal, I suppose. We will have to have a breakwater for either canal. Most harbor entrances, I believe, are protected by breakwaters. But the commerce of the city of Duluth needs that land and the buildings that will make the best possible protection for the inner harbor by building those buildings down here.

Now, the pine trees growing upon Park Point are a most wonderful protection to the inner harbor. It is simply wonderful what those little trees will do. I have often observed that at my cottage on the bay side. When the waves are roaring on the lake shore, I could carry a candle in my hand on the bay front, because the trees deflected this wind and sent it over.

Now, why not develop this harbor? My position is, and I think the engineers will bear me out in it, that it is a very difficult and, perhaps, impossible thing to tunnel this canal, because it is too close to the hill. The raise on this side would be too abrupt. We could build a central canal and tunnel under it and have no bridge over it. We can reach Wisconsin by tunnel or bridge, or something of this kind, but we can not cross this present canal with heavy commerce.

The senior member of the Board called upon Mr. Daugherty, who, not being present, did not respond.

The senior member of the Board called upon James A. Ferguson, who responded as follows:

Mr. JAMES A. FERGUSON. I only want to say a few words, representing the interests of the Pittsburgh Coal Company, having a large number of docks in the harbor. I will make myself very brief. I have to say only that we indorse thoroughly the position taken by Captain McDougall, Mr. Hugo, and Captain Monaghan, and Mr. Harris, in expressing a desire for a breakwater as a protection for our harbor interests. I think that is all that is necessary for me to say, and I will not take up the time of the Board.

Captain MCDOUGALL. When I was speaking there had been no reference made to the central canal, and I was in hopes the matter would not come up as it was at the other meeting here a year ago.

Our meeting of a year ago was in the interest of the whole lake commerce, advertised and well known all over the country. And we had such a meeting here and the Board of Engineers met and the people met and all the evidence they gave was for the breakwater, nothing but breakwater, commending it and recommending it. We had very intelligent lake captains; some of them were Captain Wolvin's best men. I think Captain Lyons, who gave evidence here, was his choice man, and the last evidence he gave here was the most direct and intelligent, I think, that was given.

It was in full, I think, in the last report. And it all went on until about this time of day, and a telegram came in from Cleveland, where Captain Wolvin was. He is probably the father of this central canal scheme. His men present, following that telegram, went just the opposite to the information that was furnished previous to that, that a central canal was the only thing and that a breakwater was no good. A meeting was called for in Detroit and the engineers and the people met in Detroit. The Detroit meeting was composed of men that had been listening to Captain Wolvin and not listening to the people of Duluth. Their evidence went on to fight and oppose this breakwater. The central canal question then began to get more serious thought and attention from the people at home, and they went to look into it. And they went to

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Captain Wolvin to learn how it was to be taken care of in the absence of a breakwater; if he was going to build a breakwater inside. And he promised to furnish his plans for an inside breakwater or furnish the engineers with a chart and everything where we were to have this before us.

We tried to explain to him the question of these currents. He thought the current acted in a certain way. He thought a larger entrance would make this thing so that the current would run in or out easy. And it was explained to him the hydraulic principle was the other way, the larger the area the less friction. He didn't see it that way. He wanted the central canal and he devised the plan for the inside breakwater this winter. And we began to explain to him the conditions which you gentlemen have seen down at the Superior entry the other day where this captain of his was telling you what conditions were there, that he went in there with his vessel into that entry and he couldn't work at those docks; he had to let go and go to anchor and lay off there.

When you go and see what it is to handle the shifting sands of this point—the engineer has got it on his mind; every one of you gentlemen know what it is to come back with that shifting-sand formation which you saw there yesterday—and go to work and open up another such gap as described by him with an inner breakwater, I don't see how any one can advocate such a condition as that and bring men to give testimony in relation to it unless he is a representative of some big dredge trust that has some dredging work in sight for it to do.

Captain WOLVIN. Mr. Chairman, inasmuch as I seem to be on trial here, I have the right to present a plan which, in my judgment, I think is right. I am not a fool. I would not be trying to fool you engineers. How shortsighted it would be in me!

I am amazed that Captain McDougall would make such a statement as he has made here now. If he knew what he was talking about he would refrain. He makes a charge that at the meeting, all through my influence, I got our fellows together and I hit them on the head with a club and said, "You've got to go this way or don't go at all." I want to pledge you my word, with every man in this room as a witness, that I never by word or by act, except joining with Mr. Colby in the original telegram, from that time right on down to this meeting, sought to say a word even to our own captains except to say to them, "What would you think of a central canal?" The idea of urging them or influencing them or committing them in any way to talk on any proposition, canal, or anything else, I pledge you my word I never did it.

Now, as to being the representative of a dredge trust. Captain McDougall's whole cry has been "trust" ever since this thing first started. First it was the steel corporation that sought this, nobody else. I do not represent the steel corporation in any sense. I am not connected with it. I am not the representative of a dredge trust in any sense. I own some stock in the Chicago Great Lakes Dredge Company. Have no more to do with its contracts than you do or Captain McDougall. The thought never entered my mind at all. I hate to be charged with these things so unjustly. It don't suit me.

I thank you for the opportunity of setting myself straight before these people.

The SENIOR MEMBER OF THE BOARD. Gentlemen, the Board is here to hear any one present who desires to present anything connected with this subject to the Board. So instead of calling men by name, I ask any one present here who desires to be heard to step out here so the reporter can get all that he says.

Hon. J. C. JENKINS. Mr. Chairman, I do not desire to take up any time, but I noted this within the past moment—Mr. S. L. Perrin, president of the Commercial Club, of Superior, came into the room. I was going to ask the Board to give him an opportunity, if he so wishes, to send in a written communication. He has been very busily engaged in court, and possibly would like to give the Board some information from the standpoint of the Superior entrance.

Mr. S. L. PERRIN. Mr. Chairman, I have just this moment come into the room. Unfortunately for Superior, I am the chairman of the harbor committee. It is unfortunate that some one who is perhaps better acquainted with the situation should not speak for Superior. I have, on behalf of our people, very little to say. We are now, as we have been, opposed to the idea of any other or further interference with the Minnesota Point. We do not want a third canal. We do not want any canal that will interfere, as any canal is likely to do, with the dock property along the Bay of Superior. We would be pleased to see this Board report for the integrity of Minnesota Point. We think it is the greatest harbor protection that we can have. We prefer to have no other. Our dock owners are fearful of the result of damages, and I think perhaps

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some of them are here and, if so, they may speak for themselves. The people of Superior ask nothing but to be let alone. The Government has already provided for the reconstruction of the canal between Wisconsin Point and Minnesota Point. The funds have been provided for the work. The work is in progress, and is being carried out along the lines of the recommendations of the former board, the Board of Engineers that were here about a year ago. We would be pleased on our side to see this Board recommend some protection, if possible, for the entrance to the Duluth canal and for the property interests of the Duluth canal, so long as it does not involve the construction of a third or central canal opposite the gate or anywhere in that vicinity. That is all we have to say. We are satisfied and will be satisfied with anything you do to help out our friends in Duluth.

The senior member of the Board called upon Captain Vroman, who did not respond.

The senior member of the Board asked if there were any lake captains present, to which Mr. J. Adam Bede responded that he did not think there was one in the hall now.

Mr. H. B. FRYBERGER. I appear here as attorney for the Central Dock Company, the Great Lakes Tug Company, and the Western Dock Company. These companies have acquired about 3,300 feet frontage dock property on the easterly side of Rices Point, and contemplate improving it. As you can readily see, it will be a very vast property when improved, and requires the investment of a very large sum of money. They also have a large dock property farther down.

Now, these companies are all in favor of the breakwater, and I think that all of the property owners on Rices Point, in fact, all of the dock property owners in the city, are in favor of the breakwater and the canal as it now is. I had supposed, until I heard Captain Wolvin get up here a few minutes ago, that the sentiment in Duluth was unanimous in favor of the canal as it now is, and I knew the captain formerly was in favor of a central canal, but I supposed that had died out entirely. I believe, with Mr. McGonagle, that the business interests of Duluth are unanimous in favor of the canal as it now is and a breakwater to protect it.

Mr. L. H. HARRIS: I spoke simply as an individual before, and I know you desire to know the wishes of property owners, and I am not going to make any argument at all. I represent the Alger-Smith Company, one of the largest lumber concerns in the Northwest. I am their attorney, and they have authorized me—Mr. Millen, their general manager, has authorized me—to voice their sentiments here on that question. We have about 50 acres of land on the extreme end of Rices Point. It will be seriously affected by any action you may take. It is covered by a lumber yard and sawmill. They also have about 40 acres in the upper bay, near Grassy Point, which point you went by yesterday. Alger-Smith Company are thoroughly in favor of the construction of a breakwater, and are opposed to the construction of a central canal.

Mr. F. C. BYRAN. Mr. Chairman, I represent the St. Paul and Western Coal Company. We have large dock interests at Conners Point. We are very much in favor of the construction of a breakwater, and very much opposed to the construction of a new canal. We think it would injure our property very much.

At this time the Board took a recess until 3 p. m. the same day, to meet at the United States Engineer Office.

STATEMENT OF MAJ. GRAHAM D. FITCH, CORPS OF ENGINEERS.

UNITED STATES ENGINEER OFFICE,
Duluth, Minn., June 20, 1907.

COLONEL: I have the honor to submit for the consideration of the Board, the following statement:

Lately there has been considerable expression by vessel men in favor of an extension of the Duluth Harbor basin for anchorage purposes, by enlarging it to the southward.

Recent experiences, in my opinion, show that such an extension is evidently needed, and the demand for it will be greater with the increasing number and size of vessels doing business at this harbor.

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About April 30, 1907, a congestion of vessels occurred in the harbor, due to the sudden opening of a passage through the ice in St. Marys River and Whitefish Bay, which let through a large fleet that had been delayed by the ice. One hundred large vessels were said to be in the harbor at that time, either at the docks or awaiting their turn. There were then lying at anchor in the Duluth Harbor basin at one time 34 vessels, and 24 of these were lashed together, side by side. There were 6 in another bunch, and 4 in a third bunch. The weather was calm, and they lay in safety, but filled up the space in front of the canal, so that vessels passing in and out had to turn out of their way in order to get by them. They might have been arranged so as to occupy the space farther to the south and out of the channel, but they came in suddenly, and the harbor inspector was not ready for them, and after a lot of them had dropped anchor it was thought best not to shift them.

During northeast storms the harbor basin is too rough to allow vessels to lay alongside in the above-mentioned manner. In the storm of May 12–14, 1907, a large number of vessels, said to be 18 or 20, came to anchor. These were all separate, and for want of room interfered with each other. Some of them dragged anchor, and many of them rubbed together, causing damage amounting, it is stated, to several thousand dollars, and much anxiety among the vessel men.

The present harbor basin at Duluth contains 171 acres. It is respectfully recommended that the harbor basin be enlarged to the south of the Duluth Canal entrance by dredging a strip about 2,300 feet wide and 4,500 feet long; this proposed extension would add 187 acres, making a total of 358 acres. The area then available for anchorage (leaving a channel open for the movement of vessels) would be nearly 1 mile long by nearly half a mile wide.

The amount of dredging needed to give a mean depth of 22 feet at low water datum would be four and one-half million yards. The estimated contract price is 11 cents per yard, which, with 1 cent for administration, makes a total of 12 cents, or an aggregate cost of $540,000. To do this work would require at least two or three years, and it might be advantageous to allow a longer time, say five years, for a smaller plant could then handle it, and more of the dredged material could be used for dock filling, thus permitting lower prices.

The work should progress continuously from the northerly end, with cuts running east and west, so as to make the dredging done each year immediately available for anchorage. The material is sand, and could be excavated with a hydraulic machine to the extent of available room for deposit. Probably much of the sand could be deposited on the bay shore of Minnesota Point, and this would serve a useful purpose by widening and strengthening this strip of land which forms a protection to the harbor.

This extension would necessitate the changing of the Minnesota Point harbor line, by setting it in toward the shore 1,000 feet for a distance of 4,500 feet from the present harbor basin. At the same time it would probably be advisable to set the remaining portion of this harbor line (extending to the south) farther in toward the shore of Minnesota Point by an amount of 500 feet or less, according to the locality. These changes in the harbor line would not interfere with any existing private improvements and would probably work no hardship to any riparian owner, and so should be done without cost to the Government.

If one of the largest vessels, 600 feet long, were shown on the chart riding at anchor with 100 feet of cable out, the circle in which she would swing would occupy a large space, but of course vessels could anchor quite near each other and swing together without interference in case of moderate or ordinary shifts of wind, and if properly distributed under the direction of the harbor master a large number of vessels could be accommodated within the space recommended.

I do not recommend the construction of a breakwater in front of the Duluth canal, as, in my opinion, the advantages to be obtained thereby are not sufficient to warrant the heavy cost of construction. As bearing on this point, some statistics are respectfully submitted herewith.

Very respectfully,

GRAHAM D. FITCH,
Major, Corps of Engineers.

Col. H. M. ADAMS,
Corps of Engineers, Senior Member of Board,
Duluth, Minn.

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STATISTICS SUBMITTED BY MAJ. GRAHAM D. FITCH, CORPS OF ENGINEERS.

Number of vessels entering Duluth Harbor during the past ten years.

[Tugs not included. From records of the U. S. Engineer Office at Duluth.]

1896	3,737
1897	3,120
1898	3,464
1899	5,034
1900	4,929
1901	3,964
1902	4,595
1903	4,045
1904	3,426
1905	4,103
Total for ten years	40,417

Vessels failing to enter Duluth Canal, or suffering injury while entering, during the past ten years.

[From records of the U. S. Engineer Office at Duluth, and "Meteorological Chart of the Great Lakes."]

	Damage.
1. Schooner *Connelly Brothers*, August 22, 1899, parted towline during heavy gale and went on piers	$1,000
2. Schooner *Thomas Gawn*, November 9, 1903, in tow of steamer *John Harper*, with 900 feet of towline, and wind from north to northwest, drifted against south pier and sank in harbor	3,200
3. Steamer *North Wind*, September 3, 1905, struck south pier and sank in harbor; heavy sea and current running out	65,000
4. Steamer *Mataafa*,[a] November 28, 1905, struck north pier and stranded north of canal; heavy sea and current running out; 9 lives lost; subsequently raised. (Her consort, left anchored outside, weathered storm safely. Two vessels entered safely during height of storm, the worst on record.)	225,000
5. Steamer *Isaac L. Ellwood*,[a] November 28, 1905, struck north pier and sank in harbor; heavy sea and current running out; subsequently raised	10,000
Total damage	304,200

Number of vessels wrecked on Lake Superior west of Sand Island during the past ten years.

[From "Wrecks and Casualties on the Great Lakes," and "Meteorological Chart of the Great Lakes," Washington Weather Bureau, supplemented by data from the customs office, Duluth, and other sources.]

1896	1
1897	0
1898	3
1899	6
1900	0
1901	1
1902	4
1903	4
1904	3
1905	13
Total	35

LETTER OF J. T. ROSE, VESSEL AND MARINE INSURANCE AGENT.

DULUTH, MINN, *June 18, 1907.*

DEAR SIR: The writer notes your desire to have written communications from Duluth citizens interested in the matter of protection and improvement of our harbor.

[a] It is claimed that this vessel struck bottom first. Entrance is now to be dredged to a minimum depth of 30 feet.

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I have lived here for twenty-five years, and have been a representative of vessel interests all that time, and for ten years before coming here I was a sailor.

In the first place, I want to say most emphatically that I am in favor of an outside breakwater parallel with Minnesota Point, as the only means, so far as I can see, to properly protect this harbor and render the canal entrance safe for vessels at all times. This should be built from, say, Fourteenth avenue east, so as to give ample room for our large steamers to straighten up for the canal piers in any kind of weather. It is possible that Twelfth avenue east, or even Tenth avenue east would be far enough, but I assume that cost of construction would not be much, if any, greater to build out from Fourteenth avenue, and the additional space would be very useful.

I believe that with the enormous growth of the trade of our port the question of cost should not be considered by our Government, as it will be amply repaid in many ways for the outlay, and the danger to loss of life at our pier entrance will be reduced to the minimum.

I think it would also have an effect upon cost of marine insurance, and might also affect freight rates in the fall of the year when our eastbound shipments are the largest. I mean in the way of reduction.

With the large area of outside harbor anchorage which we would have with a proper breakwater built, we would have ample room to take care of the large number of vessels that now frequently congest our present harbor basin, and are in the way of steamers that are moving about the harbor. Take also, for example, a case that might occur; a steamer might, from some cause, sink in our piers. All incoming boats could be warned from the breakwater, or just after passing it, and could round to and anchor.

A V-shaped breakwater, to my mind, would be simply increasing the dangers of navigation, and the area inside of it would be of no practical use.

To my mind, the proposal of a central canal should be dismissed with very curt consideration. The fewer breaches you make in nature's breakwater the better. I feel strongly on this matter, as I can not see one object to be gained by it, and I can see lots of serious injury to our present harbor basin, docks, and slips. At present we have a free movement of live, active water. If you should close present entry we would have dead, stagnant water; our slips and harbor basin that are now open until January and later would be filled with ice, and navigation, so far as shipments from these slips and docks are concerned, would close some time before the Sault canal and river was closed.

One argument, and about the only one of any weight, advanced by parties who favored this proposal was a saving of time. The writer's office overlooks the harbor entrance, the harbor, and the turn at Rices Point for the upper bay, and I have carefully noted since this subject was mooted the time occupied in crossing from the entry to this turn at Rices Point. I have used a powerful marine glass for the purpose, and I think it is safe to say that not more than fifteen minutes at the outside could be saved in time, but, for the sake of augument, call it half an hour, that would be an hour going in and out; basing twenty trips a year for our big steel boats, would make the time saved in season twenty hours. This is not worthy of much consideration.

I would suggest calling before your Board our local tug masters. There are no men more competent to give an opinion on this matter, as they particularly understand the question of currents, etc.

The matter of improvements inside of our piers can be safely left with the officers in charge of the district, as I have no doubt their recommendations will be for the best interests of the port.

Yours, sincerely,

JAMES T. ROSE.

Col. H. M. ADAMS,
Chairman, Board of U. S. Army Engineers, Duluth, Minn.

LETTER OF JAMES A. FERGUSON.

PITTSBURGH COAL COMPANY,
Duluth, June 19, 1907.

DEAR SIR: I have to hand you herewith letter under date of June 14, addressed to myself, from Mr. O. H. Simonds, of the West Duluth Land Com-

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pany, expressing his views regarding the requirements of Duluth Harbor and request that you present same to the Board of Engineers.

Yours, truly,

JAS. A. FERGUSON.

Maj. GRAHAM D. FITCH,
Duluth, Minn.

LETTER OF O. H. SIMONDS.

WEST DULUTH LAND COMPANY,
Duluth, Minn., June 14, 1907.

DEAR SIR: I fear that out-of-town business engagements will prevent my attending the hearing set for the 19th instant before the Board of Engineers, appointed pursuant to the provisions of the last river and harbor act to consider plans for the improvement of the Duluth Harbor and the protection of navigation interests.

I regard this as a very important meeting, and I had fully intended to be present, both on account of being a member of the committee of the Commercial Club, appointed for that purpose, and being deeply interested in the subject as a citizen.

The interests represented by me are located in the bay of St. Louis, on the Minnesota side, and I am naturally desirous to have those waters reached as expeditiously and directly as possible. At the same time, I have never become satisfied, as yet, that it would be a safe and prudent operation to open a central canal, so called, across Minnesota Point, in the vicinity of the interstate bridge between Duluth and Superior. The base of Minnesota Point has a substantial foundation of gravel and coarse stones to rest upon, but, so far as I know, 1 mile or more down the point the whole shore substance is sand. Much complaint has been made by the owners of dock property on Rices Point lately as to the effect of wave action through the canal now in operation. If a wider canal were cut farther down the point its effect upon Connors Point and the southerly end of Rices Point would be likely to be very great, and it might jeopardize the entire barrier of Minnesota Point, upon which we rely for the protection of our harbor. So that at present I must record myself as against the central canal proposition.

I believe, however, that the interests of the upper harbor, especially in view of the establishment of the plant of the United States Steel Corporation thereon, require that a direct channel should be cut from the western terminus of the canal to the channel which passes into St. Louis Bay; not only a new channel should be cut, but the intermediate area should be dredged out as a reasonable anchorage for the extended commerce which is growing larger every year. With such widening of the channel there would be comparatively little delay in reaching the upper waters, and in most cases, I suppose, the use of a tug in the Bay of Duluth might be dispensed with.

To my mind, the best suggestion of a breakwater in the lake is that which has been worked out in the local United States Engineer Office. Its distance from the canal is such as to give vessels a fair chance to take their course after coming into the lee of the breakwater, and I should think would be extremely advantageous to maritime interests.

If you will present these suggestions to the Commission as coming from me I shall be under many obligations.

Yours, very truly,

O. H. SIMONDS.

Mr. J. A. FERGUSON,
Duluth, Minn.

LETTER OF D. A. PETRE.

DULUTH, MINN., *June 18, 1907.*

DEAR SIR: Having noticed through our papers that your Corps of Engineers are to hold a meeting at our Commercial Club on the 19th instant, for the purpose of discussing local harbor improvements, in which our citizens are asked to cooperate, would respectfully submit the inclosed paper for what it is worth.

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I am neither a vessel owner or agent, and only express my views as a plain citizen, having observed local conditions for thirty-five years, so I trust you will pardon my intrusion.

Respectfully, yours, D. A. PETRE.

Col. H. M. ADAMS,
Chief of Government Harbor Engineers, City.

SUGGESTIONS FOR HARBOR IMPROVEMENTS.

[Extract from the Duluth Evening Herald.]

In the latter part of November, 1872, the old-timers at the head of the lakes witnessed one of the worst storms on Lake Superior, when four vessels went ashore between the outer dock and the south of the canal, but with no loss of life. During this storm the spray dashed clear over the smokestack of elevator A, at a height of some 104 feet, and the sea swept over the docks to a depth of 2 feet. The great storm of November 28, 1905, eclipsed this record because of the great loss of life as well as property. As a result of this catastrophe, numerous views have been advanced to prevent a future occurrence by protecting the canal entrance.

An outside breakwater has been the subject of controversy, but, eliminating the cost of such a ponderous undertaking, would it not offer perhaps even greater danger to vessels than do the present canal piers? What difference if a boat strikes the one or the other? During a third of a century's residence at the head of the lakes in the experience of the writer and other old residents, since the construction of the original canal, it has been a well-known fact that the current from the St. Louis River has been diverted through it. It was on this account that the people of Wisconsin forced a bill through Congress compelling the city of Duluth to construct a dike between Minnesota and Rices points, on the ground that the deflection of the current of the St. Louis River had caused the filling up of the Superior entry. This dike was built at a cost of about $100,000, and was hardly completed, when, at the instigation of the Wisconsin people, through an act of Congress, the city of Duluth was again ordered to make a breach in it to accommodate the people of Superior. It was left to them to blow it open, which they did. Now all this is ancient history to the old Duluthians, but may lead up to the argument, as when this dike existed the current of the St. Louis River flowed in another direction. No Government or any other engineer can dispute the fact that a strong current flows through our canal. This current meeting a northeast sea creates a sort of whirlpool some hundred or so feet outside the canal entrance, and here is where vesselmen encounter their worst enemy; it is here where the rudder seems to lose its usefulness, but when once the boat is fairly within the canal the danger is past.

To overcome this difficulty the first suggestion would be to turn, if possible, this current through a central part of Minnesota Point.

Another suggestion—flare out the piers on the lake side of the canal, which would make the entrance easier, and straighten out the funnel in the bay end of the piers, which in its nature sends the seas broadcast over the whole harbor, to the detriment of shipping.

Before this funnel-shaped inner entrance to the harbor was made, little inconvenience to the loading or unloading of vessels was experienced.

These remarks and suggestions must not be taken as criticizing the Government engineers, as the structural work of our canal, aside from the changes suggested, is a piece of engineering that any country should be proud of, but they have not had the opportunity to observe local conditions as well as others who have spent their lives in Duluth.

January 15, 1906. D. A. PETRE.

LETTER OF J. W. MANN.

WEST DULUTH, MINN., *June 19, 1907.*

To my jugdment there can be a breakwater constructed at about Twelfth avenue east, running south until opposite the canal, and at least 12 or 15 feet above water; then boats can come in behind it and be safe, and will protect Lake avenue property.

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I don't think it would be advisable to open up a new canal opposite the interstate bridge. I think it would be too rough for small boats.

Respectfully, yours,

J. W. MANN.

U. S. ENGINEERS.

LETTER OF GEO. A. WIELAND.

GENTLEMEN: I have noticed in our daily papers that your Board has asked the public to submit in writing suggestions for the proposed improvement or breakwater to protect the entrance to the said harbor, and I would therefore beg to submit for your consideration the plan as shown on the blueprint herewith inclosed.

The advantages of this style of protection, it appears to me, are numerous, and of such importance as to demand a very careful consideration before final action is taken.

Respectfully, yours, GEO. A. WIELAND.

BOARD OF U. S. ENGINEERS,

Met in the city of Duluth for the purpose of deciding upon a suitable plan of protection for the entrance to Duluth Harbor.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 222.

BIG SANDY RIVER, INCLUDING POUND RIVER AND RUSSEL FORK, VIRGINIA AND KENTUCKY.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF HEADWATERS OF BIG SANDY RIVER, INCLUDING POUND RIVER AND RUSSEL FORK, VIRGINIA AND KENTUCKY.

DECEMBER 9, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 5, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated 3d instant, together with copy of a report from Maj. J. G. Warren, Corps of Engineers, dated June 15, 1907, of a preliminary examination of Big Sandy River, including Pound River and Russel Fork, Virginia and Kentucky, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 3, 1907.

SIR: I have the honor to submit herewith for transmission to Congress report of June 15, 1907, by Maj. J. G. Warren, Corps of Engineers, on preliminary examination authorized by the river and harbor act approved March 2, 1907, of Big Sandy River with a view to improving its headwaters, including Pound River and Russel Fork, Virginia and Kentucky.

Big Sandy River and its tributaries, the Tug and Levisa forks, in their lower reaches, are now under improvement with a view to securing slack-water navigation. In addition to this, the Tug Fork for 100 miles and the Levisa Fork for about 150 miles have been cleared of such obstructions as would interfere with the floating of logs and navigation by push boats.

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From the facts and for the reasons given, I concur in the views of the district officer, the division engineer, and the Board of Engineers for Rivers and Harbors that the headwaters of Big Sandy River, including Pound River and Russel Fork, are not worthy of improvement by the United States at the present time.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF THE HEADWATERS OF BIG SANDY RIVER, INCLUDING POUND RIVER AND RUSSEL FORK, VIRGINIA AND KENTUCKY.

WAR DEPARTMENT,
UNITED STATES ENGINEER OFFICE,
Cincinnati, Ohio, June 15, 1907.

GENERAL: I have the honor to report as follows on a preliminary examination made in compliance with Department letter dated March 14, 1907, and as provided for in the river and harbor act approved March 2, 1907, as follows: "Big Sandy River, with a view to improving its headwaters, including Pound River and Russell Fork."

The headwaters of Big Sandy River include Tug Fork and Levisa Fork and their tributaries. The present project for the improvement of this river and the forks contemplates the extension of slack water to the mouth of Pond Creek on Tug Fork, a distance of 60 miles above its junction with Levisa Fork, and to Pikeville on Levisa Fork, 87 miles above the junction.

Tug Fork rises in McDowell County, W. Va., and flows in a northwesterly direction to its junction with Levisa Fork. Its channel has been cleared of obstructions for a distance of 100 miles above the mouth of the "Roughs," and for a distance of 60 miles this improvement has been maintained. Above the latter point the river is narrow and crooked and unsuitable for any sort of navigation, except the floating of logs, and this traffic may be carried on with the river in its present condition and without further improvement. A railroad is in operation through practically the entire length of the valley.

Levisa Fork is the larger fork of Big Sandy River and rises in the Cumberland Mountains in southwestern Virginia. It flows northwesterly through a narrow valley and is joined by its principal tributary, Russel Fork, soon after entering Kentucky. Above Pikeville it is not navigable by steamboat, except for a distance of 13 miles (to the mouth of Russel Fork), and this only at high water. For a distance of 61 miles above Pikeville the channel has been cleared of such obstructions as would interfere with the floating of logs and navigation by push boats, and it does not seem probable that there would be any great increase in navigation if the river were further improved. Above the mouth of Russel Fork the fall of the river probably exceeds 10 feet per mile.

One preliminary examination of Russel Fork has been made with a view to its improvement by the United States. This examination was made by Maj. D. W. Lockwood, Corps of Engineers, whose report may be found on page 2476, Annual Report of the Chief of Engineers for the year 1891. His recommendation was adverse to improvement by the General Government.

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Russel Fork is about 80 miles in length and drains an area of about 600 square miles. About 12 miles above the mouth are the "Breaks," where the slope of the river is great and the channel is obstructed by large bowlders. These conditions make the floating of logs precarious and all other forms of navigation impossible. The "Breaks" are about 8 miles in length, and above this point the stream is narrow and crooked and the fall great. It is regarded as unfit for navigation.

Pound River is a small tributary of Russel Fork, entering just above the "Breaks," on the south side. Its improvement could be of no commercial advantage unless the lower part of Russel Fork should also be improved.

In order to ascertain the wishes of those interested and the probable value of the improvement of any of these streams the following circular letter was sent out:

WAR DEPARTMENT,
UNITED STATES ENGINEER OFFICE,
Cincinnati, Ohio, March 5, 1907.

SIR: The river and harbor act which recently became law provides for a preliminary examination of the headwaters of the Big Sandy River, including Pound River and Russel Fork, with a view to its improvement by the United States. In this connection it is desired to obtain the views of those who are interested in the matter both as to the desirability of such improvement, its character, and the general public benefit to be derived therefrom, also such statistics as may be available concerning the commerce to be benefited. These should give the quantities of the commodities which would probably be shipped by water, and for convenience in tabulation it is requested that the following classification be used:

Cross-ties ----------number-- ———
Timber----------thousand B. M. feet-- ———
Miscellaneous ----------tons-- ———

I will greatly appreciate any information that you can supply, and would be pleased to have the same at the earliest possible time.

Very respectfully,

J. G. WARREN,
Major, Corps of Engineers.

A list [a] of the persons to whom it was sent and copies of all replies [a] received are appended. The information conveyed in these replies was of an indefinite and often of an unreliable nature.

The headwaters of the Big Sandy River are all small, torrential mountain streams, flowing through a sparsely populated country whose chief resources are timber and probably coal. It is a poor agricultural country, and there are practically no manufactories. The improvement desired seems to be the removal of obstructions to the floating of loose logs. Such improvement would unquestionably be of benefit to the owners of timber and timber lands in the locality in question, but as unquestionably would have no relation to any general interest of navigation.

For this reason I am of the opinion that the headwaters, etc., of the Big Sandy River are not worthy of improvement by the United States, and no survey is recommended.

Very respectfully, your obedient servant,

J. G. WARREN,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[a] Not printed.

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[First indorsement.]

ENGINEER OFFICE, U. S. ARMY, CENTRAL DIVISION,
Detroit, Mich., June 21, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army, concurring in the views, opinion, and recommendation of the district engineer.

G. J. LYDECKER,
Colonel, Corps of Engineers,
Division Engineer, Central Division.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., August 26, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

Big Sandy River is now under improvement by the United States, in accordance with the project adopted March 3, 1899, with a view of obtaining slack-water navigation from the Ohio River to Pikeville, on Levisa Fork, and to the mouth of Pond Creek, on Tug Fork, by the construction of 21 locks and dams at an estimated cost of $4,725,000. The improvement now desired, as indicated by the language of the act ordering this examination and statements of those interested, is the clearing out of the headwaters of Big Sandy River, including Russel Fork, which is a tributary of Levisa Fork, and Pound River, which is a tributary of Russel Fork.

The physical characteristics of these streams and the industrial conditions in the tributary country are described in the within report, from which it appears that the territory is now sparsely populated, and though rich in timber resources and probably coal, it is a poor agricultural country and contains but few manufactories.

The headwaters of the Big Sandy River are all small, torrential mountain streams, unadapted to general navigation. An examination of Russel Fork was made in 1890 by Maj. D. W. Lockwood, Corps of Engineers, who reported that "the stream is to all intents and purposes a mountain torrent and at the 'Breaks,' about 12 miles above its mouth, the fall is so rapid that the running of loose logs at any stage of water is unprofitable."

In view of the unfavorable character of the streams and the undeveloped condition of the surrounding country, the Board is of the opinion that the expenditure of the amount necessary to open these tributaries of Big Sandy River is not justified at the present time.

In addition to the report of the district officer, the Board has had before it a statement [a] from Hon. John W. Langley, M. C., in behalf of the proposed improvement, but in view of the facts stated in previous paragraphs, the Board concurs with the district officer and the division engineer in the opinion that the headwaters of Big Sandy River, including Pound River and Russel Fork, are not worthy of improvement by the United States at the present time.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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[a] Not printed.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 223.

RICHLAND CREEK, TENNESSEE.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF RICHLAND CREEK, TENNESSEE.

DECEMBER 9, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 5, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated December 4, 1907, together with copy of a report from Maj. Wm. W. Harts, Corps of Engineers, dated August 20, 1907, of a preliminary examination of Richland Creek, Tenn., made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 4, 1907.

SIR: I have the honor to submit herewith, for transmission to Congress, report of August 20, 1907, by Maj. Wm. W. Harts, Corps of Engineers, on preliminary examination of Richland Creek, Tennessee, authorized by the river and harbor act of March 2, 1907.

From the facts and for the reasons given I concur in the opinion of the district officer, the division engineer, and the Board of Engineers

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for Rivers and Harbors that this stream is not worthy of improvement by the Federal Government at the present time.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF RICHLAND CREEK, TENNESSEE.

ENGINEER OFFICE, UNITED STATES ARMY,
Chattanooga, Tenn., August 20, 1907.

GENERAL: In accordance with the instructions of your letter of March 14, 1907, I have the honor to submit the following report of preliminary examination of Richland Creek, Tennessee, required by the river and harbor act of March 2, 1907. This creek was inspected by me at Dayton, Tenn., in July, 1907.

Location and description.—Richland Creek rises in Bledsoe County, in the Cumberland Mountains, and flows southeasterly, emptying into the Tennessee River near Dayton, about 40 miles above Chattanooga. It has two forks, which unite about 3.2 miles from the Tennessee River and 1.15 miles below the town of Dayton. Dayton is situated on the larger of these forks, called the "Big Richland." The creek is composed of short pools and frequent shoals, and has an average fall of 8.4 feet per mile. The low-water discharge as measured in 1899 amounted to but 15 cubic feet per second at two points below the forks, the larger tributary sometimes going dry. After heavy rains the creek rises sometimes to the height of 10 to 12 feet at Dayton. It is therefore seen to be a small, swift, "flashy" stream.

Former examination.—Richland Creek was examined in 1899 and report submitted by Maj. Dan C. Kingman, Corps of Engineers (Annual Report of the Chief of Engineers for 1900, p. 3075). The following is quoted from this report:

> From the insignificant character of the stream, from its excessive slope, its small discharge, and from the comparatively few industries to be benefited, I am of the opinion that it is unworthy of improvement by the General Government.

A reconnaissance survey was made in August, 1899, by Mr. C. A. Turrell, assistant engineer, the report of which may be found at the same place. A new reconnaissance is therefore not necessary.

Counties affected.—The headwaters of Richland Creek come from Bledsoe and Rhea counties, the creek flowing through the latter of these counties. The statistics of these counties as given in the census report for 1900 are as follows:

County.	Population, 1900.	Area, square miles.	Population per square mile.
Bledsoe	6,626	400	16.5
Rhea	14,318	365	39.2
Total	20,944	765	27.4

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The total assessed valuation of all property in these two counties was reported as follows in 1900:

Bledsoe	$847,526
Rhea	3,048,148
Total	3,895,774

The country through which the stream flows is thus seen to be comparatively undeveloped and sparsely populated.

Commercial statistics.—There is at present no navigation on Richland Creek. The only city on this creek is Dayton, with a population of about 2,000, the principal industries of which are two pig-iron furnaces owned by the Dayton Coal and Iron Company. This company operates a railroad in connection with its furnaces to bring in ore from boats on the Tennessee River, the road running the entire distance of 4¼ miles along the course of Richland Creek. The daily capacity of these furnaces is 300 tons of iron. Besides these furnaces there are several stores, an ice factory, and a steam flouring mill in the town. It is also a station on the Queen and Crescent Railroad. The total value of the annual tonnage shipped last year to and from Dayton amounted to $12,873,825, as estimated by the Commercial Club of the city of Dayton. The total value of the tonnage carried by the Dayton Coal and Iron Company's private railroad is estimated by this club to be $240,590. What portion of this traffic would pass over an improved river it is impossible to predict. In view of the excellent transportation facilities now available, it is probable that the river commerce would be but slight, if anything at all. It is reported that already the navigation of the Tennessee River, within four miles of Dayton, has had an important effect upon railroad rates. Additional facilities in Richland Creek would doubtless have but little further influence in this respect.

Improvements practicable.—It is doubtful whether any adequate improvement could ever be established between Dayton and the Tennessee River at anything like a reasonable cost. Nothing less than a system of several locks and dams would overcome the great fall, and it is questionable whether the supply of water is sufficient to cover the loss by lockage, leakage, and evaporation. The cost of any such work would be out of all proportion to the benefit which would probably be received by the general traffic of the vicinity.

Recommendation.—In view of the foregoing, I give it as my opinion that Richland Creek is unworthy of improvement by the Federal Government at the present time.

Very respectfully,

WM. W. HARTS,
Major, Corps of Engineers.

BRIG. GEN. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

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[Third indorsement.]

OFFICE DIVISION ENGINEER, GULF DIVISION,
New Orleans, La., September 7, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army, concurring in the within recommendations.

E. H. RUFFNER,
Colonel, Corps of Engineers,
Division Engineer.

[Fifth indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., September 30, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

An examination of the within and a former report on preliminary examination of Richland Creek, Tennessee, clearly indicates the impracticability of any useful improvement by less radical means than a system of locks and dams, and it is not even certain that this method would be successful as the supply of water at low stages is probably insufficient to meet ordinary loss by evaporation, leakage, and lockage.

The fall from Dayton to the mouth of the creek, a distance of about 4½ miles, is reported to be 36.7 feet, or an average of over 8 feet per mile. The discharge at low water is given as 15 cubic feet per second.

Aside from the question of feasibility, the benefits that would accrue to the general public as a result of the improvement, if accomplished, would, in the opinion of the Board be very small and entirely incommensurate with the cost of the work. In view of these facts the Board must concur with the unfavorable views of the district officer and the division engineer, and report that in its opinion it is not advisable for the United States to undertake the improvement.

Interested parties were invited by the district officer to submit their views regarding the necessity of this improvement, but no communications upon this subject have been received.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 224.

SHEM CREEK, OR RIVER, SOUTH CAROLINA.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORTS OF EXAMINATION AND SURVEY OF SHEM CREEK, OR RIVER, SOUTH CAROLINA.

DECEMBER 9, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 5, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated 4th instant, together with copies of reports from Capt. G. P. Howell and Capt. E. R. Stuart, Corps of Engineers, dated June 3 and October 14, 1907, on a preliminary examination and survey, respectively, of Shem River, South Carolina, made by them in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 4, 1907.

SIR: I have the honor to submit herewith, for transmission to Congress, reports of June 3, 1907, by Capt. G. P. Howell, Corps of Engineers, and of October 14, 1907, by Capt. E. R. Stuart, Corps of Engineers, on preliminary examination and survey, respectively, of Shem River, South Carolina, authorized by the river and harbor act approved March 2, 1907.

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At the time of making the preliminary examination it appeared that the locality would be worthy of improvement provided the same could be effected at reasonable cost, and a survey was ordered in conformity with the law.

In his report of October 14, 1907, Captain Stuart presents a plan for securing a channel 60 feet wide and 4 feet deep at mean low water, at a first cost of $9,000, and $1,000 annually for maintenance after completion. In the opinion of this officer the importance of the commercial interests involved is sufficient to warrant the expenditure of the necessary funds, and the improvement is recommended.

After considering the results of the survey the division engineer, Lieut. Col. Dan C. Kingman, Corps of Engineers, concludes that Shem River is not worthy of improvement by the United States, and for the reasons given in its report of October 28, 1907, this opinion is concurred in by the Board of Engineers for Rivers and Harbors.

I concur in the views of the division engineer and the Board of Engineers for Rivers and Harbors.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF SHEM CREEK, OR RIVER, SOUTH CAROLINA.

UNITED STATES ENGINEER OFFICE,
Charleston, S. C., June 3, 1907.

GENERAL: I have the honor to submit the following report upon the preliminary examination of Shem River, South Carolina, as directed in section 3 of the river and harbor act of March 2, 1907:

Shem River, or Shem Creek, as it is generally known, is shown on coast chart No. 445, "Charleston and Vicinity," as flowing around the northern side of the village of Mount Pleasant into Hog Island channel. The entrance is obstructed by a sand shoal, and there are other shoals in its length of 2 miles—about four in number—where the low-water depths are 2 feet or less, but generally the depths are sufficient for small boats. Beyond the point 2 miles from the mouth the stream is about 50 feet wide and is too small to be considered. The rise of tide is about 5 feet.

The creek derives its importance from the fact that it penetrates the valuable farming land in the vicinity of Mount Pleasant. This region has been in late years a noted section for early spring vegetables, especially asparagus. The long staple sea-island cotton is also grown here. The importance of this section is enhanced by its accessibility to the shipping facilities of Charleston. Numerous creeks, tributary to the Cooper and Wando rivers and to the inland waterway behind Sullivans Island, afford means for getting the truck to the markets and railroads in Charleston, for there are no railroads on that side (the eastern) of Cooper River. Shem Creek is merely one of these little streams, but as it is situated at the village of Mount Pleasant and has on its banks a shipyard for small vessels, may be regarded as the most important.

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The average yearly commerce is as follows:

	Tons.	Value.
Truck	2,200	$175,000
General freight	13,000	83,800
Total	15,200	258,800

Of the truck, asparagus is the most important. In value it is about one-half of all the other truck produced. Its quality is highly regarded, the average value per crate being about $6. The general freight consists of cotton, fertilizers, and groceries. The business is done in small gasoline boats and sloops with a draft of 3 feet; the largest does not exceed 13 gross tons. As there are several shoals where the low-water depth is less than 2 feet, the boats have to run according to the tides, and while this is a matter of small importance to the general freight, which is not perishable and has only to cross the channel between Charleston and Mount Pleasant, it is quite different with the truck. To insure its arrival in the northern markets in the best condition, it should be gathered and shipped the same day. The transportation companies fix an hour in the afternoon after which no more of this freight will be received. If the shipper is prevented by low tide from getting his produce there in time, he is subjected to a great hardship. There are nine farmers who make their shipment by this route, and there is besides the shipyard at the village.

I regard Shem Creek of sufficient importance to warrant a survey, which can be done at small cost. Then it can be determined if the expense of obtaining the channel desired—4 feet at low water—will be justified. The survey and map-making will cost $200, and it is recommended that this allotment be made.

Very respectfully,

G. P. HOWELL,
Captain, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First Indorsement.]

OFFICE OF DIVISION ENGINEER, SOUTHEAST DIVISION,
Savannah, Ga., June 4, 1907.

Respectfully submitted to the Chief of Engineers, U. S. Army.

I concur in the view of the district engineer that this waterway is of sufficient importance to warrant a survey, and it is recommended that an allotment of $200 be made for this purpose.

DAN C. KINGMAN,
Lieut. Col., Corps of Engineers,
Division Engineer, Southeast Division.

[Third Indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., June 10, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

Shem River is one of a number of small streams emptying into Cooper River in the vicinity of Charleston, S. C., which affords routes

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to market for a productive area having no railroad facilities. The district officer states that Shem River is the most important of these small streams, being situated at the village of Mount Pleasant and having on its banks a shipyard for small vessels.

The commerce is reported to consist of about 15,200 tons, having a valuation of about $258,800, of which 2,200 tons are perishable farm produce, valued at $175,000. It is in the interest of these commodities that the improvement is principally desired, as under present conditions obstructing shoals limit the low-water depth to less than 2 feet, and boats must run on favorable tides.

While the commerce is small in volume, the cost of making a survey to prepare a plan of improvement is inconsiderable. Believing that it is desirable to know the cost of the work before expressing an opinion as to the advisability of the United States undertaking the improvement of Shem River, the Board concurs with the district officer and the division engineer in recommending that a survey be authorized.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

[Fourth indorsement.]

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, June 13, 1907.

Respectfully submitted to the Secretary of War.

This is a report on preliminary examination of Shem River, South Carolina, authorized by the river and harbor act of March 2, 1907.

Inviting attention to the report of the Board of Engineers for Rivers and Harbors in the preceding indorsement, I recommend that a survey of the locality, as proposed, be authorized.

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

[Fifth indorsement.]

WAR DEPARTMENT,
June 13, 1907.

Approved as recommended by the Chief of Engineers.

ROBERT SHAW OLIVER,
Acting Secretary of War.

SURVEY OF SHEM CREEK, OR RIVER, SOUTH CAROLINA.

UNITED STATES ENGINEER OFFICE,
Charleston, S. C., October 14, 1907.

GENERAL: I have the honor to submit the following report of the survey of Shem River, South Carolina.

The estimate is divided into two parts, from the mouth to the line *a-a*, and from the line *a-a* to the line *c-c*, shown on tracing herewith.[a]

[a] Not printed.

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To provide a channel 60 feet wide and 4 feet deep at mean low water the estimate is as follows:

Mouth to *a-a*, 12,000 cubic yards, at 30 cents	$3,600
a-a to *c-c*, 18,000 cubic yards, at 30 cents	5,400
Total, 30,000 cubic yards	9,000

The price given is as low as it is believed can be secured on as small a total of yardage as that involved.

The principal interests involved in this proposed improvement are concentrated at three points: Hall's shipyard, opposite Hamlins Landing; R. W. Nix's wharf, and Mitchell's wharf. The interests involved and the necessity for the improvement are set forth in Captain Howell's report of preliminary examination made under date of June 3, 1907. The average annual commerce to be benefited is there given as—

	Tons.	Value.
Truck	2,200	$175,000
General freight	13,000	83,800
Total	15,200	258,800

The principal shipping points for truck are Nix's wharf and Mitchell's wharf.

The importance of the commercial interests involved is believed to be sufficient to warrant the expenditure of the necessary funds, and the improvement of Shem River from its mouth to Mitchell's wharf, at the line *c–c* on the map herewith, by dredging a channel of the stated dimensions at a cost of $9,000, is respectfully recommended.

The estimate for maintenance is $1,000 per year, based upon the belief that the annual shoaling of the dredged channel at the mouth of the river will approximate one-fourth of the total amount now to be removed.

Very respectfully,

E. R. STUART,
Captain, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

OFFICE OF DIVISION ENGINEER, SOUTHEAST DIVISION,
Savannah, Ga., October 15, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army.

After considering the results of the survey herein described, I am of the opinion that this river, or creek, is not worthy of improvement by the Government. It would seem from the map that the total length of this proposed improvement is only about 1¼ miles, and it requires dredging nearly all the way to secure the very moderate improvement that would be afforded by a channel 60 feet wide and 4 feet in depth at low water. This improvement is at the rate of more than $7,000 a mile, and it is estimated that it will require an expenditure of $1,000 a year to maintain it. This would represent a capitalization of $25,000 at 4 per cent.

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The benefit resulting from the improvement seems to me to be very local, and if the improvement is made at all it ought to be nearly, if not wholly, at the expense of the sole beneficiaries.

DAN C. KINGMAN,
Lieut. Col., Corps of Engineers,
Division Engineer, Southeast Division.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., October 28, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

It appears from the results of the survey of this waterway that a channel 60 feet wide and 4 feet deep at mean low water will cost $9,000 for construction and $1,000 annually thereafter for maintenance.

The district officer believes the interests involved are sufficient to warrant this expenditure, but the division engineer does not concur in this view.

The total commerce of the stream is reported to amount to 15,200 tons, of which 2,200 tons are truck, and the rest general merchandise. It is stated in the report on preliminary examination that this commerce is carried on vessels having a draft of 3 feet, that the range of tide is about 5 feet, and that the boats have to run according to the tides, which is a matter of small importance to the general freight, but of considerable importance to the truck which is taken to Charleston and shipped by rail on schedule time.

It would appear from these facts that the improvement would be a convenience rather than a necessity for about four-fifths of the total commerce, leaving only about 2,000 tons to be actually benefited by increased navigation facilities.

The improvement would be rather local in character, as the number of persons concerned is small, stated to be nine farmers, and it is hardly probable that the influence of the improvement would be felt by general commerce, or the price of commodities or freight rates reduced.

In view of the large cost of the work proposed when compared with the small tonnage actually needing improved facilities and the local benefits to result from the work, the Board concurs with the division engineer in believing that it is not advisable for the United States to undertake the improvement of Shem River.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 324.

KEWAUNEE HARBOR, WISCONSIN.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION, WITH PLAN AND ESTIMATE OF COST OF IMPROVEMENT, OF KEWAUNEE HARBOR, WISCONSIN.

DECEMBER 12, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed, with accompanying illustration.

WAR DEPARTMENT,
Washington, December 9, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated 6th instant, together with copies of reports from Maj. W. V. Judson, Corps of Engineers, dated April 12 and July 25, 1907, of a preliminary examination of Kewaunee Harbor, Wisconsin, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 6, 1907.

SIR: I have the honor to submit herewith for transmission to Congress reports dated April 12, 1907, and July 25, 1907, with map, by Maj. W. V. Judson, Corps of Engineers, on preliminary examination, with plan and estimate of cost of improvement, authorized by the river and harbor act approved March 2, 1907, of Kewaunee Harbor, Wisconsin, with a view to obtaining depths of 18 and 20 feet, respectively.

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The plan of improvement presented is for an entrance channel and turning basin, with a depth of 20 feet, at an estimated first cost of $53,690. Major Judson reports that the annual cost of maintenance to be borne by the United States will be but slightly increased for the greater depth now proposed for this harbor over that of maintaining the 15-foot depth in accordance with the existing project.

I concur in the opinion of the district officer, the division engineer, and the Board of Engineers for Rivers and Harbors that Kewaunee Harbor is worthy of improvement by the United States in the manner proposed, but subject to certain conditions given at length in Major Judson's report of July 25, 1907.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF KEWAUNEE HARBOR, WISCONSIN.

UNITED STATES ENGINEER OFFICE,
Milwaukee, Wis., April 12, 1907.

GENERAL: As directed in letter, Office of the Chief of Engineers, March 14, 1907, I have the honor to submit the following report upon a preliminary examination made in compliance with the following item in section 3, river and harbor act of March 2, 1907: "Kewaunee, Wisconsin, with a view to obtaining depths of eighteen and twenty feet, respectively."

The harbor of Kewaunee, Wis., is situated on the western shore of Lake Michigan at the mouth of the Kewaunee River, about 100 miles north of Milwaukee. The adjacent harbors to the north are Algoma (Ahnapee) and Sturgeon Bay, distant 12 miles and 27 miles, respectively; those to the south are Two Rivers and Manitowoc, distant 24 miles and 30 miles, respectively.

The city of Kewaunee had a population in 1906 of 1,890.

Kewaunee is the eastern terminus of the Kewaunee, Green Bay and Western Railroad, a short line extending between Kewaunee and Green Bay, but making connections at the latter city with the Green Bay and Western Railroad, by which it is controlled and operated. This latter road has its western terminus at Winona, Minn., and connects with railways to the west and northwest. Connections are also made at Green Bay with the Chicago and North Western and the Chicago, Milwaukee and St. Paul railways. The car ferries of the Ann Arbor Railroad and the Pere Marquette Railroad ply regularly between Kewaunee and the termini of the said railroads on the east shore of Lake Michigan, forming in connection with the Kewaunee, Green Bay and Western Railroad a through route between the east and west.

The present project of improvement adopted in 1881, and modified in 1892, provides for the formation of a channel 15 feet deep, from the bend in the Kewaunee River about 2,000 feet south of the original river mouth to Lake Michigan, and for a small turning basin in the inner harbor. The entrance channel is about 150 feet wide, the parallel piers protecting same being about 200 feet apart.

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The project was completed in 1898 at a cost of about $150,000. The total appropriations by the United States to date amount to $177,852.19, in addition to which the local authorities appropriated $8,042.72 in 1881, which was expended by the United States under the direction of the engineer officer in charge.

Under date of April 18, 1899, a report was made by Capt. J. G. Warren, Corps of Engineers, on a preliminary examination of this harbor "with a view of making a harbor of refuge with a depth of not less than 20 feet." In this report Captain Warren stated that "the local demands of commerce are amply provided for," but considered the proposed improvement to be worthy, and recommended that a survey be made.

In his report on the survey, however, Captain Warren estimated the cost of the proposed improvement at $230,000. He further stated that the needs of commerce for a harbor of refuge were already provided for by the harbors at Sturgeon Bay and at Manitowoc to such an extent as to render inadvisable the creation of an additional harbor of refuge at Kewaunee at that time.

These reports, with map of harbor, to which attention is invited, are published in House Document No. 362, Fifty-sixth Congress, first session.

The only regular line of steamers other than those employed in the car-ferry business is that of the Goodrich Transit Company. The steamers of this line, plying between Chicago and points along the west shore of Lake Michigan, make Kewaunee a regular port of call. These steamers do a mixed passenger and package freight business.

Appended to this report is a table showing shipments and receipts by way of the harbor during each of the past three years.

The present project depth of 15 feet has been well maintained, and has been sufficient to permit of the entrance of the car ferry and Goodrich Company's steamers.

Efforts have been made by the interested railroad officials to induce some line of steamers plying between Lake Michigan ports and the lower lakes to make Kewaunee a regular port of call; but their efforts have been unsuccessful, probably because the present depth of channel is insufficient. It is probable that if a channel 20 feet deep were provided a regular line of steamers would make Kewaunee a port of call, and thereby provide another lake-and-rail route between the east and west.

The receipts of coal have nearly doubled during the past three years, and it is confidently asserted that if a depth of 20 feet were established and maintained a coal dock for the transshipment of coal would be built. At the present time most of the vessels engaged in the coal-carrying business draw too much water to enter this harbor.

To obtain a deph of 20 feet, thereby making this harbor accessible to all classes of vessels, the only work necessary to be done by the United States would be a moderate amount of dredging in the present channel and the enlargement of the present turning basin in the inner harbor by cutting off the point between the present river and the old river channel. A part of the cost of the enlarged turning basin should be borne by the city of Kewaunee, and if a report on a survey is ordered a definite recommendation on this point will be made. As no hard material would probably be encountered, the cost would not be

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excessive and in my opinion would be entirely commensurate with the probable benefits to general commerce which would result therefrom.

For the foregoing reasons the harbor of Kewaunee, Wisconsin, is believed to be worthy of further improvement with a view to obtaining a depth of 20 feet. There are probably sufficient data available upon which to base an estimate of cost; therefore it is not thought that a survey will involve any field work.

Very respectfully,

W. V. JUDSON,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

OFFICE DIVISION ENGINEER, NORTHWEST DIVISION,
Chicago, Ill., April 15, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army.

I concur in the views expressed by Major Judson.

W. H. BIXBY,
Lieut. Col., Corps of Engineers,
Division Engineer, Northwest Division.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., April 29, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

The district officer states that the present project depth of 15 feet at Kewaunee Harbor has been well maintained and has been sufficient to permit the entrance of the car ferry and the one line of steamers calling at this port. A depth of 20 feet is advocated in order to make the harbor accessible to all classes of vessels navigating the Great Lakes, and the district officer and the division engineer unite in believing the locality worthy of further improvement with this object in view.

In the opinion of the Board the advisability of undertaking additional improvement at this harbor depends to a great extent upon the expenditure required and the probable effect of the improvement on the general commerce of the lakes. As sufficient data are available upon which to base an estimate of cost, the Board recommends that an estimate be authorized.

In his further report it is requested that the district officer state, if practicable, what part of the commerce reported is local and what part is handled by car ferries, and what influence the proposed improvement will have upon the general commerce of the lakes aside from its effect upon the ferriage of through freight that could be carried over routes already established through improved neighboring harbors.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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[Fourth indorsement.]

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, May 3, 1907.

Respectfully submitted to the Secretary of War.

This is a report on preliminary examination of Kewaunee Harbor, Wisconsin, authorized by the river and harbor act of March 2, 1907.

Inviting attention to the report of the Board of Engineers for Rivers and Harbors in the preceding indorsement, I recommend that preparation of plan and estimate of cost of improvement of this locality, as proposed, be author zed.

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

[Fifth indorsement.]

WAR DEPARTMENT,
May 4, 1907.

Approved as recommended by the Chief of Engineers.

ROBERT SHAW OLIVER,
Assistant Secretary of War.

Shipments and receipts for the port of Kewaunee, Wis., by way of the harbor only.

[Furnished by Mr. Charles Pistor, deputy collector of customs.]

SHIPMENTS.

Commodities.	1904.		1905.		1906.	
	Unit.	Quantity.	Unit.	Quantity.	Unit.	Quantity.
Barley	Bushels ..	164,225	Bushels ..	92,000	Bushels ..	491,810
Corn	.....do	152,975	.....do	10,515	.....do	9,450
Oats	.....do	218,050	.....do	139,760	.....do	86,100
Rye	.....do	11,000	.....do	238,975	.....do	177,670
Wheat	.....do	8,000	.....	.....	.....do	700
Malt	Sacks.....	6,500	Tons.....	8,670	Tons.....	5,350
Flour	Barrels ...	13,025	Barrels ...	7,950	.....do	1,808
Feed	.....	.....	Tons.....	512	.....	.....
Mill stuff	Sacks.....	7,800	.....	.....	.....	.....
Peas	Bushels ..	425,000	Bushels ..	385,000	Bushels ..	450,800
Canned peas	.....	.....	Tons.....	235	Tons.....	180
Potatoes	Bushels...	1,050	.....	.....	.....	.....
Butter	Pounds...	265,000	Pounds ...	280,500	Pounds ...	453,000
Cheese	.....do	1,500,000	.....do	2,200,000	.....do	2,500,000
Eggs	Cases	8,300	Cases	10,500	Cases	11,200
Salt	Barrels ...	300	.....	.....	Barrels ...	85
Groceries	Tons.....	620	.....	.....	.....	.....
Hides	Bales.....	1,500	Bales.....	1,950	Bales.....	2,300
Wool	Sacks.....	525	Pounds...	85,000	Pounds...	90,000
Hay	.....	.....	Tons.....	339	Tons.....	1,924
Lime	.....	.....	Barrels ...	10	.....	.....
Lumber	Feet B. M.	4,800,000	Feet B. M.	6,150,000	Feet B. M.	2,614,000
Paper	.....	.....	Tons.....	420	Tons.....	149
Manufactured iron	Tons.....	4	.....	.....	.....	.....
Copper	.....	.....	Tons.....	90	Tons.....	25
Coal	.....	.....	.....do	56	.....	.....
Unclassified	Tons.....	29,662	.....do	13,091	Tons.....	18,920

RECEIPTS.

Grain	Bushels...	6,640	.....	.....	.....	.....
Barley	.....	.....	.....	.....	Bushels...	9,000
Potatoes	.....	.....	Bushels...	70	.....do....	75
Green fruits	Packages.	3,600	Packages.	10,150	Packages.	5,500
Sugar	.....do	3,050	.....	.....	Tons.....	80

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Shipments and receipts for the port of Kewaunee, Wis., by way of the harbor only—Cont'd.

RECEIPTS—Continued.

Commodities.	1904.		1905.		1906.	
	Unit.	Quantity.	Unit.	Quantity.	Unit.	Quantity.
Salt	Barrels	8,860	Tons	53	Barrels	3,030
Beer			Cases	580	Cases	750
Wood, cord	Cords	466	Cords	715	Cords	620
Lumber	Feet B. M.	701,000	Feet B. M.	1,440,000	Feet B. M.	341,000
Coal	Tons	24,376	Tons	27,150	Tons	45,025
Cedar posts					Pieces	1,000
Ties			Cords	14,175	do	4,253
Tan bark			do	60		
Cement	Barrels	4,480	Tons	30	Tons	690
Plaster	do	1,000				
Pig iron			Tons	25	Tons	252
Manufactured iron			do	1,714	do	4,768
Unclassified	Tons	28,741	do	8,460	do	17,419

ARRIVALS AND DEPARTURES.

	1904.		1905.		1906.	
	Number.	Tonnage.	Number.	Tonnage.	Number.	Tonnage.
Steamers	440	377,164	437	362,475	434	365,313
Schooners	42	1,562	30	2,012	12	1,140
Total	482	378,726	467	364,487	446	366,453

PLAN AND ESTIMATE OF COST OF IMPROVEMENT OF KEWAUNEE HARBOR, WISCONSIN.

UNITED STATES ENGINEER OFFICE,
Milwaukee, Wis., July 25, 1907.

GENERAL: I have the honor to present the following plan and estimate of cost for the improvement of Kewaunee Harbor, Wisconsin, as directed by the Chief of Engineers in letter of May 10, 1907.

It is recommended that the present entrance channel be dredged to a depth of 20 feet and that a turning basin of the same depth be excavated, cutting away part of the point included between the old and present river channels. The area to be deepened is indicated upon accompanying map.

At a comparatively moderate expenditure the proposed improvement will permit the larger vessels to enter this port and will give good turning facilities. Easy approaches will also be given to both the old and new channels of the river, either of which may easily be made to afford excellent port facilities. The annual cost of maintenance to be borne by the United States will be but slightly increased incident to the greater depth proposed for this harbor.

The cost of improvement is estimated as follows:

Deepening present channels, 160,634 cubic yards, at 18 cents	$28,914
Dredging "point" for turning basin, 110,525 cubic yards, at 18 cents	19,895
	48,809
10 per cent for contingencies and supervision	4,881
Total	53,690

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If appropriation be made for the dredging herein proposed, it should be provided that no expenditure be made until the following conditions have been complied with:

First. The city of Kewaunee to donate or cause to be donated to the United States all land that must be acquired for the formation of the turning basin.

Second. The city of Kewaunee to hold the United States free from liability for all damages that may be claimed by riparian owners as a result of the dredging herein proposed.

Third. The city of Kewaunee to give satisfactory assurance that it will cause to be constructed, as soon as dredging has progressed sufficiently, a suitable revetment, along the line marked "A," across the point between the old and present river channels.

The following table is compiled from data furnished by the deputy collector of customs, Kewaunee, Wis.:

Water-borne freight shipments and receipts.

	Receipts, 1906.				Shipments, 1906.			
	Tonnage.		Value.		Tonnage.		Value.	
	Tons.	*Per cent.*	*Dollars.*	*Per cent.*	*Tons.*	*Per cent.*	*Dollars.*	*Per cent.*
Local	14,240	20	847,520	23	30,188	40	3,171,111	54
Through	57,130	80	2,759,582	77	45,032	60	2,664,906	46
Total	71,370	100	3,607,102	100	75,220	100	5,836,017	100

The greater part of the through tonnage at the present time is handled by car ferries which are operated in connection with the Kewaunee, Green Bay and Western Railway, which is controlled by and forms a part of the Green Bay and Western Railway. These railways form a route 261.70 miles long extending from Kewaunee westward to the Mississippi River.

It is impracticable to state with exactness what part of the commerce is handled as through commerce by car ferry. In the preparation of commercial statistics dependence must be placed upon the record kept by the deputy collector, and this record does not distinguish between the commerce handled by car ferries and by other vessels.

Practically all the coal received at Kewaunee for through shipment comes by car ferry. This method of transporting coal is practically "all-rail transportation," and is not the most economical method.

Only a small proportion of the coal imported is for local consumption. The greater part, if not all, of this coal comes in bulk by vessels from lower lake ports. Such vessels are of the smaller class of lake carriers, the present project depth being insufficient for the larger vessels when fully loaded.

The present harbor facilities are ample for the present car-ferry business, but it is believed that the deepening of the channel and the enlarging of the turning basin, as hereinbefore proposed, will result in benefit to the general commerce of the lake as follows:

A large increase in the receipts of coal carried by deep-draft vessels from Lake Erie ports. Coal thus received would be reshipped by rail to points to the westward.

An increase in the shipments of grain to lower lake ports by large vessels, generally by those bringing coal to the harbor.

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The establishment of one or more regular lines of steamers from the lower lakes, connecting with railroads at Buffalo or elsewhere, for the transportation of package freight. All of the principal Eastern railway lines, such as the Erie, Lackawanna, New York Central, etc., operate large package freighters from their lower lake terminals to Lake Michigan ports. This opens up many additional and convenient routes of transportation east and west.

The great gain to general commerce through the deepening of Kewaunee Harbor would be incident to the creation of a port competing with existing ports by means of the railroads above mentioned for through business between points in Wisconsin, Minnesota, and neighboring States on the one hand, and eastern points reached by the Great Lakes on the other.

For the foregoing reasons, and in view of the comparatively small cost of the improvement, it is my opinion that the harbor at Kewaunee, Wis., is worthy of improvement in the manner proposed and subject to the conditions hereinbefore stated.

Very respectfully,

W. V. JUDSON,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

OFFICE DIVISION ENGINEER, NORTHWEST DIVISION,
Chicago, Ill., July 26, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army, recommended for approval.

W. H. BIXBY,
Lieut. Col., Corps of Engineers,
Division Engineer, Northwest Division.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., October 7, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

The district officer submits an estimate of cost, in the sum of $53,690, for deepening to 20 feet the existing channels at Kewaunee Harbor and providing a turning basin of the same depth. He expresses the opinion that this improvement is worthy of being undertaken by the United States, provided that no expenditure be made until the following conditions have been complied with:

First. The city of Kewaunee to donate or cause to be donated to the United States all land that must be acquired for the formation of the turning basin.

Second. The city of Kewaunee to hold the United States free from liability for all damages that may be claimed by riparian owners as a result of the dredging proposed.

Third. The city of Kewaunee to give satisfactory assurance that it will cause to be constructed, as soon as dredging has progressed sufficiently, a suitable revetment, along the line marked "A," across the point between the old and present river channels.

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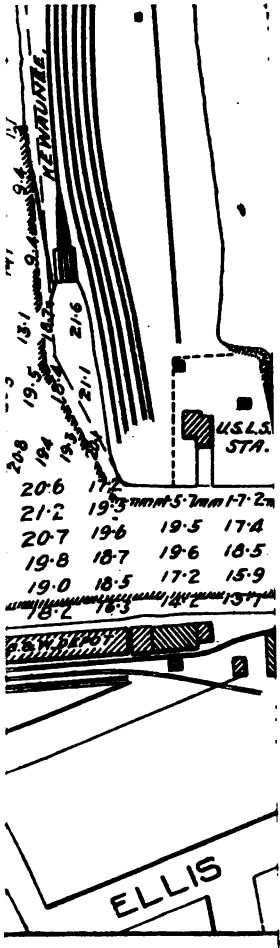
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Very respectfully,

Brig. Gen. A. MACKENZIE,
Chief of Engineers,
(Through the Division E

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recommended for approval.

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BOARD OF ENGINEERS

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The statistics of commerce contained within indicate that the water-borne freight receipts and shipments during 1906 amounted to 146,590 tons, valued at $9,443,119. The local commerce amounted to 44,428 tons, and the through commerce amounted to 102,162 tons. As the greater part of the through tonnage is handled by car ferries for which the present harbor facilities are ample, the advisability of undertaking the improvement appears to rest upon whether the outlay necessary will be justified by the probable benefits which it will afford to present local traffic, and by the prospective development of general lake commerce to and from this port, as a result of making it accessible to the class of vessels engaged in such commerce.

While the commerce of the harbor is not large, the cost of the work recommended by the district officer is comparatively small, and the Board believes that the probable benefits which the improvement will afford by facilitating the growth of a more general and competitive traffic are sufficient to justify the expenditure. It therefore concurs with the division engineer in recommending the adoption of the project proposed by the district officer under the conditions specified.

For the Board:

R. L. HOXIE,
Colonel, Corps of Engineers,
Senior Member Present.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 325.

KEWEENAW CANAL, MICHIGAN.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION, WITH PLAN AND ESTIMATE OF COST OF IMPROVEMENT, OF EASTERN ENTRANCE TO KEWEENAW CANAL, MICHIGAN.

DECEMBER 12, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed, with accompanying illustration.

WAR DEPARTMENT,
Washington, December 11, 1907.

SIR: I have the honor to transmit herewith a letter from the Acting Chief of Engineers, U. S. Army, dated 10th instant, together with copies of reports from Maj. Graham D. Fitch, Corps of Engineers, dated August 22 and October 30, 1907, upon a preliminary examination of Keweenaw Canal, Michigan, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 10, 1907.

SIR: I have the honor to submit herewith for transmission to Congress reports of August 22, 1907, and October 30, 1907, with map, by Maj. Graham D. Fitch, Corps of Engineers, on preliminary examination, with plan and estimate of cost of improvement, authorized by the river and harbor act approved March 2, 1907, of Keweenaw Canal, Michigan, with a view to the construction of a harbor of refuge at its eastern entrance.

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The object of the improvement is to provide a harbor where vessels may seek refuge in time of storm and where eastbound boats going through Keweenaw Canal may lie to and wait for clearing weather before passing out into the open water of Lake Superior. The plan presented contemplates the excavation of a basin, with mooring pier, just within the eastern entrance to the canal, and involves the acquisition of a considerable tract of land in addition to that pertaining to the present canal property. The project is estimated to cost $210,000, and is recommended by the local officer and the division engineer, Lieut. Col. W. H. Bixby, Corps of Engineers.

These reports have been referred, as required by law, for consideration by the Board of Engineers for Rivers and Harbors. In its final report of November 11, 1907 (herewith), the Board expresses the opinion that it is desirable for the United States to undertake the improvement, and recommends the adoption of the general project proposed by the district officer, leaving the details to be determined at the time of execution, and, in addition, that no expenditure for the work be authorized unless the land needed can be acquired at a reasonable cost, either by purchase or condemnation.

I concur in the views and recommendations of the Board of Engineers for Rivers and Harbors.

Very respectfully,

SMITH S. LEACH,
Acting Chief of Engineers.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF KEWEENAW CANAL, MICHIGAN, WITH A VIEW TO THE CONSTRUCTION OF A HARBOR OF REFUGE AT ITS EASTERN ENTRANCE.

UNITED STATES ENGINEER OFFICE,
Duluth, Minn., August 22, 1907.

GENERAL: In compliance with Department letter of March 14, 1907, I have the honor to submit the following report upon a preliminary examination of "Keweenaw Canal, with a view to the construction of a harbor of refuge at its eastern entrance."

Previous reports.—The demand for a harbor of refuge at the locality in question was made the subject of a special report by Maj. Chas. L. Potter, Corps of Engineers, to the Chief of Engineers, U. S. Army, dated December 29, 1903, at which time Major Potter was the officer in charge of this district. The statements made by that officer are applicable at the present time, and attention is invited to the following extract from his report:[a]

9. Another necessity has arisen, however, which should be provided for by Congress. The excellent harbor of refuge, known as the Lily Pond, near the upper end of the canal, has been a great relief to vessels in storms. It is formed by widening the canal to a width of 600 feet and building a substantial revetment with mooring posts for vessels to tie up to during storms. The entire length is often taken up with vessels, and in many cases they lie side by side, there not being room to accommodate all lying singly. Vessels in passing down the canal often, when reaching the lower end of the canal, find northeast storms, which prevent their going to sea, and some place of refuge is necessary where they can safely tie up, and they have to either return to Houghton or Hancock and pay dockage charges, or return to Lily Pond, which they are liable to find overcrowded. Two small docks, known as the Stone dock and Edgerton's dock, exist at the lower end of the canal, and, as an illustration of the necessity of a tying-up place at this point,

[a] The report has never been printed.

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vessels are often tied up three and four deep at these two docks, obstructing the channel and receiving very poor accommodations.

10. Such a harbor of refuge is, in my opinion, one of the greatest conveniences that could be provided for navigation on Lake Superior at the present, and will in a few years, by the time it can be completed, be an absolute necessity.

The views expressed by my predecessor, Major Potter, are concurred in by me, and are believed to hold true at the present time.

The question of a harbor of refuge at this point was further considered in a report of Maj. Charles L. Potter to the Chief of Engineers, dated October 14, 1905, printed in House Document No. 158, Fifty-ninth Congress, first session, on a preliminary examination of the "south shore of Lake Superior, in the vicinity of Keweenaw Point, with a view to determining whether a harbor of refuge should be established in that locality."

In this report Major Potter recommends the establishment of a harbor inside Portage entry, in accordance with his special report of December 29, 1903, to the Chief of Engineers, above quoted.

The indorsement of Colonel Bixby, division engineer, on the last-mentioned report contains the following clause:

I consider a harbor of refuge in the Portage Canal, near its Keweenaw end, as suggested by Major Potter, to be practicable, to be well worth its cost, and to be rapidly becoming an absolute necessity to navigation using the south shore of Lake Superior in the vicinity of Keweenaw Point, and enough so already as to justify and demand its immediate construction.

The conclusion of the Board of Engineers for Rivers and Harbors and of the Chief of Engineers was that the project for such a harbor of refuge was meritorious in itself, but the locality did not fall within the scope of the act of Congress of March 3, 1905, which called for the preliminary examination. The words of the Chief of Engineers on this point, as printed in House Document No. 158, Fifty-ninth Congress, first session, are as follows:

The desirability of the construction of a harbor of refuge at the lower end of the Portage Canal as incidental to the construction and operation of that canal has been presented to Congress in the Annual Reports of the Chief of Engineers with the statement that the work would be simple, involving only the enlargement of the canal and construction of revetment, that it was recommended as of great value to navigation, and that an estimate of cost could be submitted without further investigation. It is believed, however, that a harbor of refuge in this locality was not contemplated by Congress in the item authorizing the preliminary examination of the south shore of Lake Superior in the vicinity of Keweenaw Point.

Commerce.—During the navigation season of 1906 the commerce through this waterway amounted to 2,632,355 tons of freight, valued at $102,846,779, and 72,400 passengers. The increase in freight tonnage over that of the preceding year amounted to 9 per cent.

The number of vessels using this waterway in the same year was 3,567, having a net registered tonnage of 2,454,414.

The execution of improvements to this waterway, by enlargement of the channel and protection of the entrances, since the acquirement of title by purchase in 1891 has been followed by a rapid increase in the amount of vessel commerce transacted up to the year 1902. It then fell off temporarily for the next two years, but has been increasing again since then, and was greater in 1906 than in any year previous. As far as can be judged from the past history of this canal and the development of business in the northwest territory which makes use of the Great Lakes waterway, there is likely to be a further increase in the number of vessels and volume of freight through the Keweenaw

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waterway and of vessels running there for shelter. The execution of the improvement contemplated would not only give greater accommodation to present commerce, but would probably induce other vessels to make use of this waterway that now pass around the end of Keweenaw Point.

The only mooring piers in this waterway that are free for the use of navigators are at the Lily Pond harbor of refuge, and this is at a distance of 24 miles from the Keweenaw Bay entrance. So that if a harbor with mooring piers were provided near the Portage entry it would effect a saving of three or four hours for vessels downbound in putting out to sea after waiting for weather.

A possible alternative plan would be to build mooring piers in the lower end of Portage Lake in the expanse of deep water just above the head of Portage River. This would save some expense, as compared with a harbor constructed near the mouth of the river, by avoiding dredging and the purchase of land for a site. This difference in cost, however, would not, in my opinion, offset the disadvantages of being situated at a distance of 6 miles from the entrance, where it would be impossible for the navigator to watch the weather and sea of Keweenaw Bay directly, and would require communication with some special watchman by telegraph or telephone, and finally an hour's run through the river in order to reach the entrance. As many as 46 vessels have been tied up at one time at Lily Pond waiting for weather.

In view of the foregoing facts I am of the opinion that the construction of a harbor of refuge at the eastern entrance of Keweenaw Canal is an improvement worthy to be undertaken by the Government.

Plans and an estimate of cost for the improvement under consideration can be prepared without an additional allotment of funds.

Respectfully submitted.

GRAHAM D. FITCH,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

OFFICE DIVISION ENGINEER, NORTHWEST DIVISION,
Chicago, Ill., August 26, 1907.

Respectfully forwarded to the Chief of Engineers.

I concur with the district engineer in his views that this work is an improvement worthy of being undertaken by the Government.

W. H. BIXBY,
Lieut. Col., Corps of Engineers,
Division Engineer, Northwest Division.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., September 3, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

This canal across Keweenaw Point, Michigan, connecting Lake Superior on the north with Keweenaw Bay on the south, is a much

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used and important waterway. It has a clear width of 120 feet and a minimum depth of 20 feet throughout its length, the width being increased at certain points. The Superior entrance has been protected by piers and breakwaters, and a harbor of refuge known as Lily Pond has been formed about a mile within the entrance by the enlargement of the canal and building revetments and mooring facilities.

This harbor is at times greatly crowded with vessels, which have to lie side by side, and it is clear that it can not accommodate all the vessels likely to enter from the north as well as from the south. Moreover, the distance from the south end to the present harbor is so great as to render its use impracticable for south-bound vessels, as they can not keep informed regarding weather conditions east of Keweenaw Point.

Attention has been called to the necessity for a harbor of refuge at this locality in several reports of the Chief of Engineers, and as stated within its necessity was recognized in a report on a preliminary examination ordered by the act of March 3, 1905, but could not be favorably recommended at that time because it was thought the locality did not fall within the scope of the act ordering the examination.

In view of these facts, the Board expresses the opinion, concurring with the district officer and the division engineer, that the construction of a harbor of refuge at the eastern entrance of Keweenaw Canal is a work worthy of being undertaken by the General Government. It is therefore recommended that a plan and estimate of cost be called for, which the district officer states can be prepared without a survey.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

[Fourth indorsement.]

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, September 7, 1907.

Respectfully submitted to the Secretary of War.

This is a report on preliminary examination authorized by the river and harbor act of March 2, 1907, of Keweenaw Canal, Michigan, with a view to the construction of a harbor of refuge at its eastern entrance.

Inviting attention to the report of the Board of Engineers for Rivers and Harbors in the preceding indorsement, I recommend that preparation of plan and estimate of cost of improvement of the locality, as proposed, be authorized.

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

[Fifth indorsement.]

WAR DEPARTMENT,
September 9, 1907.

Approved as recommended by the Chief of Engineers in the preceding indorsement.

ROBERT SHAW OLIVER,
Acting Secretary of War.

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PLAN AND ESTIMATE OF COST OF CONSTRUCTING A HARBOR OF REFUGE AT THE EASTERN ENTRANCE TO KEWEENAW CANAL, MICHIGAN.

UNITED STATES ENGINEER OFFICE,
Duluth, Minn., October 30, 1907.

GENERAL: In compliance with Department letter dated September 11, 1907, I have the honor to submit the following report, giving a plan and estimate of cost for a harbor of refuge at the eastern entrance of Keweenaw Canal, Michigan.

The necessities which call for a harbor of refuge at this place have been stated in my report on a preliminary examination dated August 22, 1907.

The locality of the proposed harbor is on the easterly shore of Keweenaw Point, Lake Superior, just inside the entrance to Portage River, which forms a portion of the waterway across Keweenaw Point. Its position with reference to the Keweenaw waterway is best shown on the United States Lake Survey colored chart of Portage Lake and River, catalogue No. Sd5, and its relation to the entire lake by Lake Survey chart No. S. The recent Lake Survey chart of Keweenaw Bay, No. Sd4, may also be consulted to advantage.

Entrance to waterway.—The entrance to the waterway is well protected by the Government breakwater, and it leaves only an exposure from a southerly direction, with a fetch of from 8 to 13 miles across the waters of Keweenaw Bay. The waves formed from this quarter can not reach serious proportions. The width of the entrance channel, known as Cut 1, is apparently rather narrow, being but 210 feet, but there has never been, as far as known to this office, any difficulty experienced by vessels in making the entrance after once coming around the outer end of the breakwater. The breakwater itself has been struck but once, as far as known, and then by a lumber barge in tow of a steamer. Inside the entrance there is never any sea worth mentioning.

For these reasons the width of the present entrance channel will probably be sufficient for many years to come, and no additional protection from the outside is required.

Proposed improvement.—The proposed improvement is the construction of a mooring pier inside the entrance, where vessels can tie up, many of them at a time, and wait for weather, and a basin alongside the pier with enough room for the vessels to turn around in.

The form of harbor which it is believed will best provide these facilities at a reasonable cost is shown on an accompanying map. It would consist in widening the present channel, by dredging, to 800 feet and a length of about one-half mile, making an area of 46 acres having a clear depth of 20 feet at low water, and in building a mooring pier along the westerly edge of the basin for a length of 2,000 feet.

With this arrangement something like twenty vessels of average size could tie up at the pier at once, by several lying alongside of each other, without encroaching upon the main channel, and at the same time would leave room enough for the longest vessel now afloat on the Great Lakes to turn around.

Dredging.—The area to be dredged is shown on the map by a broken line on the easterly side and by the heavy black line showing the mooring pier on the westerly side. Of the entire width of 800 feet there is an average width of 154 feet in the present channel having the

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full depth required. The dredging of the remaining area, estimated for an average depth of 22 feet, so as to leave a depth of not less than 20 feet, and allowing 5 per cent for expansion in scows, would require the removal of about 986,000 yards.

The material to be dredged, as shown by records in this office of former dredging at that locality, is soft clay, mud, and sand, and should be very easily dredged. The work could probably best be done by a dipper dredge and the material dumped in the lake, with a short haul. It is possible that a considerable portion of the material could be excavated with a hydraulic dredge and discharged on Government land or in shallow water within easy reach. The contract cost is estimated at 14 cents per yard. The dredging of soft material in this waterway has been done for a price as low as 11 cents per yard.

Mooring pier.—The position of the mooring pier is shown by a heavy black line on the map. The pier which has been designed for this place consists of piles and timber. There are two rows of vertical piles 11 feet between centers of the rows, the piles 4 feet center to center in each row, to be driven with the aid of a water jet in case of a sand bottom, and cut off at 5 feet above low water. Timbers will be bolted to the front row to form a facing 1 foot thick and 4 feet high, and the two rows of piles will be connected by timber cross-ties and diagonal braces. Each brace will act as a tie and strut, and altogether they will form a truss which will distribute over a number of the piles the stresses arising from a vessel pressing against any one point.

The timbers will be secured to the piles and to each other by machine bolts, without dovetails or framing. There will be a covering of 3-inch deck plank. Cast-iron mooring posts will be placed at intervals of 48 feet. For additional stiffness there will be a brace pile driven behind each of the rear piles, with a batter of 30° from the vertical, the top cut to fit into a notch with shoulder in the vertical pile, and secured to the latter by a machine bolt.

The front piles will be at the edge of the deep water of the basin, and the rear piles and brace piles will be driven in the sloping bank as left by the dredge. No sheet planks will be used, and the bottom of the ground will be allowed to take its natural slope. Piles to be of pine or tamarack, and the timber of pine or Washington fir. The length of the piles will be determined by driving test piles. They are here figured at 42 feet for the main piles and 32 feet for the brace piles.

This form of pier will not of course be as strong as a solid pier, but will probably answer the purposes fairly well, and will have the merit of cheapness, as it can probably be built at a contract cost of about $16 per linear foot, which is about one-sixth of the cost of a rock-filled crib of the best construction. Repairs can easily be made in case of accident, and it is expected to stand twelve or fifteen years before renewal is necessary on account of decay.

It may be found desirable to modify some of the dimensions or other details given in the foregoing description before actual construction begins.

Land to be acquired.—To carry out this plan for a harbor would make it necessary to cut into the marshy land on each side of the present channel. The Government now owns a tract of land on each

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side of the entrance channel, a strip about 60 feet wide and 785 feet long, on which the two range lights are placed (secured for light-house purposes), and also a group of islands to the east of the range lights which has never been platted. These are shown by a certain shading.

The land marked on the map "To be acquired" is in two parcels: (*a*) About 14 acres off the east side of lots 8 and 9, which includes a portion to be dredged for the basin, a strip about 200 feet wide outside or to the west of the basin, and a tract 300 feet wide extending back to the highway to provide for building a house for a harbormaster or watchman, or for removing to this site the present United States watchman's residence, which is located farther up the river. All this is marsh with the exception of 2½ acres. (*b*) On the east side of the basin the dredging will cut into lot 6 to the extent of 4 or 5 acres, as the basin is now laid out. It is believed best to acquire the whole of lot 6, containing about 55 acres, in order to provide for future enlargement of the basin, which may possibly be needed. This land is a boggy marsh with from half a foot to 1 foot of water over it at the present stage of the river, and would be about even with the mean surface of the river. It has no apparent value. Its assessed valuation by the county is $160, or about $3 per acre. I should not consider it worth more than $5 per acre. With such a value there would be no occasion for dividing the lot.

The 14 acres to be acquired on the west side, in lots 8 and 9, I consider of rather greater value than lot 6, and possibly $10 per acre for marshy portions, and $50 or $100 for the higher ground needed. The assessed valuation of the entire lot 8 is only $100, or less than $3 per acre, and of lot 9 $50, or about $2 per acre.

The improvements on this property consist of a wharf and warehouse standing on lot 8. Both are unused, and the wharf is going to pieces. Their value is estimated at $1,200.

The owners of these tracts place an unreasonably high value on their property, and I am of the opinion that the method of acquiring the land needed should be by condemnation.

The two range lights, including the keeper's dwelling (at the rear light) would have to be removed, and the narrow strip of land on which the lights stand would have to be dredged out, subject to suitable arrangements for this purpose with the Light-House Establishment. These range lights, placed as they are on the axis of the entrance channel, are an obstruction to navigation, and a number of vessels have run aground in recent years while turning out to pass around them. The new basin, without these range lights, would make an easier entrance to the waterway. A light at the inner end of the breakwater, along with the present light at the outer end, would undoubtedly answer all purposes, as such an arrangement does at other harbors.

Summary of cost.

Excavating basin, 986,000 yards, at 14 cents	$138,040
Mooring pier, 2,000 linear feet, at $16	32,000
Engineering, 10 per cent	17,000
Land, with improvements and cost of condemnation	2,500
Contingencies	20,460
Total	210,000

Concluding remarks.—The plans and estimates herewith have been prepared by Mr. J. H. Darling, assistant engineer.

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Mention should be made of a previous plan for a harbor of refuge at this locality submitted in a letter from Maj. Chas. L. Potter to the Chief of Engineers dated December 29, 1903. It is described in the following words, quoted from said letter:

11. A plan for this harbor is submitted on two accompanying blueprints. The harbor will be formed by dredging on one side of the channel to a distance of 200 to 350 feet from the center of the channel as the latter will be when straightened out by dredging, and building 4,350 feet of heavy revetment with mooring posts and decking. The revetment will be made of round and sheet piling and timber, being the same construction which was used in the Lily Pond. It is laid out with a view to further extension when the commerce shall call for it, and to duplication by a similar line on the other side of the channel when needed.

The estimate of cost for this plan was $150,000. This plan, however, has several disadvantages as compared to the one now recommended, among which may be mentioned: (*a*) It does not provide sufficient width of deep water for vessels to turn in, as it would give only from 250 to 490 feet, and more or less of this space would be occupied by vessels lying at the pier; (*b*) there is not the same opportunity for enlarging the basin by dredging, as the mainland to the west is generally higher and more valuable than the marsh flats to the east; (*c*) the mooring pier is farther from the entrance, and therefore not as convenient for vessels, whether running in for shelter or when down bound and waiting for weather; (*d*) the west shore is better situated for the location of supply stores which might be established by private enterprise, on account of its higher ground and its having the only highway connection with the cities of Houghton and Hancock. This is the only highway that is practicable to be built, as will be seen by consulting the charts; (*e*) there is likely to be a firmer foundation for the pier on the west side on account of its proximity to higher ground; that is, the depth of the soft material in the marsh is not likely to be as great as to the east; (*f*) the obstruction to navigation formed by the range lights, previously mentioned in this report, would remain; (*g*) the form of construction for the mooring pier is not as strong as proposed by me, and the cost of the two forms per linear foot is about the same. For these reasons I believe the plans submitted by me herewith are preferable.

Respectfully submitted.

GRAHAM D. FITCH,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First Indorsement.]

OFFICE DIVISION ENGINEER, NORTHWEST DIVISION,
Chicago, Ill., November 2, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army, the recommendations and estimates being concurred in by me.

W. H. BIXBY,
Lieut. Col., Corps of Engineers,
Division Engineer, Northwest Division.

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[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., November 11, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

The district officer presents a plan and estimate for a harbor of refuge at the eastern entrance of Keweenaw Canal, Michigan, which involves the widening of the present channel to a width of 800 feet for a length of about one-half mile, the construction of a mooring pier 2,000 feet in length along the western edge of the basin thus formed, and the acquisition of certain lands necessary in carrying out the proposed plan. The total cost of the project is $210,000.

This plan will afford facilities for tying up at the pier about twenty vessels of average size and at the same time leave room enough for any vessel to turn around. By the construction of such a harbor the congestion at the other end of the canal will be relieved, and vessels south bound can lie here during stress of weather and start upon their journey as soon as the conditions become favorable, whereas at present they must lie at the other end of the canal, where weather conditions east of Keweenaw Point can not be observed.

In the opinion of the Board the cost of the work is not unreasonable when the extensive navigation interests and the benefits to general lake commerce expected from the proposed improvement are considered. It, therefore, believes it to be desirable for the United States to undertake the work, and recommends the adoption of the general project proposed by the district officer, leaving the details to be determined at the time of construction. The Board recommends, in addition, that no expenditures for the work be made unless the land needed can be acquired at a reasonable cost, either by purchase or condemnation.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 326.

BRUNSWICK HARBOR, GEORGIA.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT REGARDING WHARFAGE PRIVILEGES AT BRUNSWICK HARBOR, GEORGIA.

DECEMBER 12, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed with illustration.

WAR DEPARTMENT,
Washington, December 9, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated 5th instant, together with copy of a report from Lieut. Col. Dan C. Kingman, Corps of Engineers, dated October 12, 1907, regarding the control and use of wharfage privileges at Brunswick Harbor, Georgia, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 5, 1907.

SIR: I have the honor to submit herewith for transmission to Congress report of October 12, 1907, prepared by Lieut. Col. Dan C. Kingman, Corps of Engineers, under orders of the Chief of Engineers, and in compliance with authority conferred by item in the river and harbor act of March 2, 1907, making appropriation for improvement of harbor at Brunswick, Ga., as follows:

Provided further, That it shall be the duty of the Chief of Engineers to ascertain if any person or corporation owning, controlling, or using any wharf or wharfage privi-

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leges at said harbor discriminates against anyone engaged in the transportation of freight by ship, vessel, or railroad, and whether any such wharf owners or wharfingers refuse to permit any vessels or ships to land at or use said wharves, and to make report thereof to Congress.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

REPORT REGARDING THE CONTROL AND USE OF WHARFAGE PRIVILEGES AT BRUNSWICK HARBOR, GEORGIA.

WAR DEPARTMENT,
UNITED STATES ENGINEER OFFICE,
Savannah, Ga., October 12, 1907.

GENERAL: The river and harbor act approved March 2, 1907, in making an appropriation for improving harbor at Brunswick, Ga., provided as follows:

Provided further, That it shall be the duty of the Chief of Engineers to asertain if any person or corporation owning, controlling, or using any wharf or wharfage privileges at said harbor discriminates against anyone engaged in the transportation of freight by ship, vessel, or railroad, and whether any such wharf owners or wharfingers refuse to permit any vessels or ships to land at or use said wharves, and to make report thereof to Congress.

The duty of securing this information was assigned to me by the Chief of Engineers in letter dated March 9, 1907. In order to carry out the instructions contained in this letter, I first caused my resident assistant engineer to obtain the names of all parties owning or leasing dock facilities in the harbor of Brunswick. I then addressed a letter to each owner and lessee, asking a series of questions calculated to secure the information desired. These letters were slightly different, depending upon whether the wharf was owned or leased, and a copy of each is transmitted herewith. Replies[a] to all of these communications were finally received and a copy of each accompanies this report.

In order that the whole information may be presented in a more concise form, I have prepared a tabulated statement in which the substance of the replies to each question is given. It appears from this that most of the wharves are owned or leased by parties engaged in shipping and receiving particular kinds of freight. These wharves are a necessary part of their plant and there would appear to be no reason why they should be generally available to the public any more than a factory or any other instrumentality used in carrying on private business. Most of these owners or lessees, however, under these circumstances, state that they make no objection to the temporary use of their wharves by vessels when the same does not interfere with their business. There is an exception to this in the case of the Southern Railway Company, and, in my opinion, it was against this company that the inquiry was directed. This is a railway company and its lines extend into the interior of the State of Georgia and elsewhere. They state that the owners or operators of a certain small river steamboat desired to obtain from them wharf privileges for which they were willing to pay. They appar-

[a] Not printed.

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ently hold the opinion that the furnishing of wharf privileges was no part of their business as a common carrier, that it interfered with their business and tended to diminish their revenue, and they declined to allow this steamboat to make use of their wharf. Attention is respectfully invited to their reply and argument. It involves certain legal questions in regard to which I do not feel competent to judge. I think, however, that the information herewith submitted is all that the Engineer Department can obtain in regard to the matter.

The following is a full list of inclosures,[a] viz:

Coney & Parker.
The Downing Company.
The Bay Iron Works.
Brunswick Dock and City Improvement Company.
Southern Pine Company of Georgia.
H. W. Whaley.
J. E. du Bignon.
James E. Brodhead.
John R. Young Company.
Benito Padrosa.
G. S. Baxter & Co.
N. Emanuel & Co.
Brunswick Lighterage Company.
Atlanta, Birmingham and Atlantic Railroad Company.
St. Simons Transit Company and Brunswick, St. Simons and Darien Steamboat Company.
John H. McCullough.
Brunswick and Florida Steamboat Company.
Hirsch Lumber Company.
American Tie and Timber Company.
Parker-Hensel Engineering Company.
Consolidated Steamship Lines (Mallory Line).
Cooney, Eckstein & Co.
Clyde Steamship Company.
Atlantic Land and Improvement Company.
Atlantic Coast Line Railroad Company.
The Capital Company.
F. D. M. Strachan & Co.
Frank D. Aiken.
Brunswick and Satilla River Route.
L. N. Watson.
Southern Railway Company.
Form of letter written to owners of wharf property.
Form of letter written to lessees of wharf property.
Synopsis of replies.

Very respectfully, your obedient servant,

DAN C. KINGMAN,
Lieut. Col., Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.

FORM OF LETTER WRITTEN TO OWNERS OF WHARF PROPERTY.

UNITED STATES ENGINEER OFFICE,
Savannah, Ga., July 16, 1907.

DEAR SIR: The act of Congress of March 2, 1907, in making appropriation for improving the harbor at Brunswick, Ga., provided that it shall be the duty of the Chief of Engineers to ascertain if any person or corporation owning, controlling, or using any wharf or wharfage privileges at said harbor discriminates against anyone engaged in the transportation of freight by ship, vessel, or railroad, and whether any such wharf owners or wharfingers refuse to permit any vessels or ships to land at or use said wharves.

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[a] The replies to the circular letters are not printed.

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I understand that you own or control certain water front in the harbor of Brunswick, which you use for wharf purposes. It is proper that I should assume at the outset that you do not discriminate against anyone engaged in the transportation of freight by ship, vessel, or railroad, or if you do discriminate that you have good and lawful grounds for your action, and that there would be no reason for concealment on your part.

To aid me in carrying out the instructions of the Chief of Engineers, therefore, I desire to ask you the following questions, viz:

First. Do you in fact own or control any water front in the harbor of Brunswick?

Second. Is there a wharf erected upon it; and if so, what is the character and for what is it used, and what is the depth of the water alongside?

Third. Is it used by the public generally?

Fourth. Do you discriminate against anyone engaged in the transportation of freight by ship, vessel, or railroad; and if so, for what reason?

Fifth. Do you refuse to permit any particular ship or vessel to land at or use this wharf; and if so, what are your reasons for so doing?

I shall greatly appreciate a prompt and full answer to the foregoing.

Very respectfully,

DAN C. KINGMAN,
Lieut. Col., Corps of Engineers.

FORM OF LETTER WRITTEN TO LESSEES OF WHARF PROPERTY.

UNITED STATES ENGINEER OFFICE,
Savannah, Ga., July 18, 1907.

DEAR SIR: The act of Congress of March 2, 1907, in making appropriation for improving the harbor at Brunswick, Ga., provided that it shall be the duty of the Chief of Engineers to ascertain if any person or corporation owning, controlling, or using any wharf or wharfage privileges at said harbor discriminates against anyone engaged in the transportation of freight by ship, vessel, or railroad, and whether any such wharf owners or wharfingers refuse to permit any vessels or ships to land at or use said wharves.

I understand that you hold, under lease from the * * * linear feet of water front in the harbor of Brunswick, which you use for wharf purposes. It is proper that I should assume at the outset that you do not discriminate against anyone engaged in the transportation of freight by ship, vessel, or railroad, or if you do discriminate that you have good and lawful grounds for your action, and that there would be no reason for concealment on your part.

To aid me in carrying out the instructions of the Chief of Engineers, therefore, I desire to ask you the following questions, viz:

First. Do you in fact control, under lease, about * * * feet of water front in the harbor of Brunswick?

Second. Is there a wharf erected upon it; and if so, what is the character and for what is it used, and what is the depth of the water alongside?

Third. Is it used by the public generally?

Fourth. Do you discriminate against anyone engaged in the transportation of freight by ship, vessel, or railroad; and if so, for what reason?

Fifth. Do you refuse to permit any particular ship or vessel to land at or use this wharf; and if so, what are your reasons for so doing?

I shall greatly appreciate a prompt and full answer to the foregoing.

Very respectfully,

DAN C. KINGMAN,
Lieut. Col., Corps of Engineers.

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Synopsis of replies received from owners and lessees of wharf property.

1 Name of owner or lessee.	2 Owner or lessee?	3 If owner or lessee of water front at Brunswick, is there a wharf erected upon it? If so, what is its character, for what is it used, and what is the depth of water alongside?	4 Is the wharf used by the public generally?	5 Do you discriminate against anyone engaged in transporting freight by ship, vessel, or railroad?	6 Do you refuse to permit any particular ship or vessel to land at or use your wharf; and if so, for what reason?
1. Coney & Parker....	Owners....	Water front, 360 feet; wharf, 120 feet long, 300 feet deep; runway on balance of property; used as a coal dock.	No; used only by those needing coal or fuel.	No; not against anyone transporting freight by water, except it is absolutely necessary to keep the dock open for coaling boats.	We do not object to boats lying at our dock if they are willing to move as soon as dock is needed.
2. The Downing Co...	Owner.....	Between 500 and 600 feet of improved wharf property in one place and 1,242 feet in another. The first wharf used to store naval stores and portion rented to Darien and St. Simons steamboat lines. The second wharf rented to other parties.	No; but any line can easily arrange to do business over any of these properties for a reasonable consideration. We are only too glad to offer inducements to steamboats to do business at Brunswick.	No; have never discriminated against any steamer or vessel, but glad for them to use our wharf.	No.
3. The Bay Iron Works.	Owners....	Water front 90 feet; wharf on west half, machine shop and foundry on east half. Front of dock used by us for mooring vessels while being repaired; part of dock rented for storage of lumber and ties. Estimate depth alongside at 5 feet at mean low water.	No.....	No; but have to keep the water front for our own use.	We do not allow any vessel to lie at our dock when we have one in for repairs, but allow it to be used temporarily when no repair work is being done.
4. Brunswick Dock and City Improvement Co., Albert Fendig & Co., agents.	.....do.....	None of the water front owned by our company is improved with docks.	.....	.....	.....
5. Southern Pine Co. of Georgia.	Owner and lessee.	Substantial pile and timber wharf used for handling lumber. Depth alongside, 12 to 16 feet at low tide.	No.....	No.....	We have never refused to permit any particular vessel to load at or use this wharf.
6. H. W. Whaley.....	Owner.....	Water front, 450 feet; 235 feet of wharf is used by National Tie Co.	No.....	No.....	No.
7. J. E. du Bignon....	.....do.....	Water front leased to N. Emanuel & Co..	See item No. 12.....	.....	.....
8. Jas. E. Brodhead...	Lessee.....	Water front, 550 feet; leased from Atlantic Land and Improvement Co. Lessor reserves right to use any portion provided same does not interfere with our use. There is a wooden wharf used almost exclusively for ties and lumber. Depth of water alongside, 17 feet at low tide.	No.....	Never had an application from any one to use wharf. Our lease provides we are not to store or ship any commodity on or over leased premises unless same reaches Brunswick via Atlantic Coast Line Rwy., except with written consent of the lessor.	All space is required for our own use, and has always been since we leased the premises in March, 1903.

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Synopsis of replies received from owners and lessees of wharf property—Continued.

1 Name of owner or lessee.	2 Owner or lessee?	3 If owner or lessee of water front at Brunswick, is there a wharf erected upon it? If so, what is its character, for what is it used, and what is the depth of water alongside?	4 Is the wharf used by the public generally?	5 Do you discriminate against anyone engaged in transporting freight by ship, vessel, or railroad?	6 Do you refuse to permit any particular ship or vessel to land at or use your wharf; and if so, for what reason?
9. John R. Young Co...	Lessee.....	Water front, 495 feet; wooden wharf, used for loading and unloading naval stores to and from vessels. Depth about 20 feet at high water.	No.....	Being private property, there is no occasion to discriminate. It is understood the wharf is for our use.	No objection to vessels using the wharf temporarily so long as same does not interfere with our business and is not injured by vessels tying up to it.
10. Benito Padrosa....	Owner.....	Greater part of our water front has a wharf erected upon it which is used for shipment of lumber, ties, etc. Depth alongside about 22 feet at high water.	Yes.....	No.....	No.
11. G. S. Baxter & Co...	Lessee.....	Water front about 650 feet; wooden wharf erected on same; used for lumber and ties. Depth alongside about 23 feet at high water.	No; always full of lumber for export.	No.....	No.
12. N. Emanuel & Co...	.....do.....	Lease from Bay Iron Works and J. E. du Bignon about 600 feet wharf front; wooden wharf; used for lumber shipments exclusively. Depth alongside about 18 feet at low tide.	No.....	No; provided same does not interfere with our own vessels.	No; except when it would interfere with our own business.
13. Brunswick Lighterage Co.	.....do.....	Lease wharf privileges from Southern Rwy. Co. at a monthly rate, and have no control over same other than the landing of our own equipment.	.....	.....	.....
14. Atlanta, Birmingham and Atlantic R. R. Co.	Owner.....	Something like one-half mile of water front, about 100 acres. There is being constructed for us a complete terminal. Two piers, 700 and 400 feet long, respectively; coaling trestle and 4 large warehouses; extensive timber basin or slip, power and ice plants, etc.	As the improvements are only partly completed, they have so far been used exclusively by the steamers of the Brunswick Steamship Co. A few other vessels have been docked there.	No.....	No.
15. St. Simons Trans. Co.; Brunswick, St. Simons and Darien Steamboat Company.	Lessee.....	Lease landing privileges at the Downing Company's wharf.	.....	No.....	No.
16. John H. McCullough	.....do.....	Water front 400 feet, belonging to Atlantic Coast Line Railroad Company. Wharf, 400 by 20 feet, used for shipping lumber and other commodities. Depth alongside, 20 feet mean low tide.	Used only by lessee. No applications received from other parties.	No; all local interests use the dock to mutual advantage.	No.

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17. Brunswick and Florida Steamboat Company.	.....do.....	Lease wharfage room, 24 feet front, from Southern Railway Company.	Yes.....	No; as to this company.....	No; as to this company.
18. Hirsch Lumber Company.	.....do.....	Water front 400 feet, under time lease from Atlantic Coast Line Railroad Company. Dock, 400 by 40 feet. Depth alongside, 12 feet low tide.	No; used exclusively by ourselves in the shipment of lumber and cross-ties.	No; used exclusively by ourselves.	Only such vessels as we have under charter land at and use the property.
19. American Tie and Timber Co.	.....do.....	Lease the Padrosa dock, 520 feet long; also 409 feet of southern end of the Downing dock; used by us for storing cross-ties and loading ships and vessels. We sublease 200 feet of north end of Padrosa dock to Atlantic Lumber Co. Depth alongside Padrosa dock, 8 to 11 feet at low tide; Downing dock, 14 to 16 feet at low tide.	No.....	No reason to discriminate against anyone, and so long as we are not hampered in doing business we have no objection to assisting anyone, if we can do so.	See answer No. 5.
20. Parker-Hensel Engineering Company.	Owner.....	Our property is used by us for docking ships for repairs and for discharging and loading small cargoes. Depth of water alongside, 18 feet.	Used only by our customers.	No.....	No.
21. Consolidated Steamship Lines (Mallory Line).	Lessee.....	Use wharves of Southern Railway Company under agreement. Depth of water alongside about 18 feet.	We do not consider we have exclusive use and have no election in matter of other vessels docking at the wharves.	No discrimination so far as this company is concerned.	See answers 4 and 5.
22. Cooney, Eckstein & Co.	.....do.....	About 300 feet of water front on which there is a wooden wharf, used for handling lumber and ties. Depth alongside, 12 feet at low tide.	No.....	No; our dock is always covered by lumber, and other commodities can not be gotten over it.	See answer No. 5.
23. Clyde Steamship Company.	See answer No. 3.	This company does not own or control any wharf or water front at Brunswick. Its steamers touch there about once every two weeks. A lump sum per month is paid our agent, and he provides necessary wharfage facilities.	.....	.....	.....
24. Atlantic Land and Improvement Company.	Owner.....	Owner of about 4,000 feet water front. About 1,500 feet of this has wharves erected upon it. Leased to lumber and cross-tie shippers, the wharves being built when application was made to lease part of the water front. Depth alongside varies from 5.3 to 15.7 feet at low tide.	The property is open to the public generally; i. e., anyone paying our standard rates can secure any available wharf frontage.	No.....	No; but, as stated in answer No. 4, the wharves are leased, and this company has nothing to do with vessels landing at or using them.
25. Atlantc Coast Line Railroad Co.	.....do.....	About 975 feet of water front, upon which a wharf is erected. Part of the property is used for freight purposes of the company, and the balance is open to the use of the public, subject to our standard wharfage charges. Depth of water alongside ranges from 12.4 to 17.9 feet at low tide.	See answer No. 3.....	No.....	No.

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Synopsis of replies received from owners and lessees of wharf property—Continued.

1 Name of owner or lessee.	2 Owner or lessee?	3 If owner or lessee of water front at Brunswick, is there a wharf erected upon it? If so, what is its character, for what is it used, and what is the depth of water alongside?	4 Is the wharf used by the public generally?	5 Do you discriminate against anyone engaged in transporting freight by ship, vessel, or railroad?	6 Do you refuse to permit any particular ship or vessel to land at or use your wharf; and if so, for what reason?
26. The Capital Company.	Lessee.....	Lease 175 feet of McCullough dock and 200 feet of Whaley dock; used for shipment of lumber and cross-ties.	No.....	No; but as the wharves are fully covered by lumber and ties this prevents its use by other parties.	See answer No. 5.
27. F. D. M. Strachan & Co.	Owners....	Own 1,000 feet unimproved water front adjoining holdings of Southern Railway; also, equal owner with Frank D. Aiken of about 774 feet water front known as the "Ellis-Young" property. The 1,000 feet of water front is open to purchase. Of the 774 feet parcel, about 200 feet is improved by a wharf and the remainder is unimproved and open to purchase.	No.....	Depends upon circumstances. The wharf is operated for revenue. Sometimes we lease it to shippers of lumber and cross-ties and when not so leased Mr. Aiken usually handles some of his lumber over it on wharfage basis.	The wharf being under lease to shippers for their own purposes, who would have vessels loading or due to load, this would, of necessity, prevent any other vessel using same.
28. F. D. M. Strachan & Co.	Lessees....	Under agreement with the Southern Railway, we lease, or are entitled to use, the major portion of the railway's terminals on Turtle River, for the conduct and operation of our transportation lines between Brunswick and foreign ports.	Naturally we would not permit any vessel or freight to block or in any way interrupt our wharf front or the wharf when we have use for it in our business. During slack seasons, when our service is interrupted or desultory, part or possibly all of this wharf is open for general traffic on the wharfage basis, provided it would not extend to such a period as to block or interrupt our business on resumption of our service.		
29. Frank D. Aiken.....	Owner.....	Owns and controls about 1,500 feet of water front. Wharves are erected on over 600 feet of same. Used almost entirely for shipment of lumber and cross-ties. Depth of water alongside, 16 feet at low tide.	I would let no one use my wharves if such use was in any way detrimental to my own business. However, if there was nothing being done on them for me, I believe I would let anyone use same for fair wharfage charges.	When my own business is dull I sometimes look up business from some of my neighbors, but do not take anything that I believe will in any way conflict with my own business.	I have in the past refused to allow some vessels at my wharves because I was expecting vessels for my own business, and as I have to give vessels for my business a berth upon twenty-four hours' notice after arrival, I declined to give room to others, believing it was too much risk for the amount of wharfage involved.
30. Frank D. Aiken.....	.....do.....	One-half interest with F. D. M. Strachan in 774 feet of water front, 200 feet of which is improved. We are willing to sell the entire property at a fair price. (See item No. 27.)	.....	.....	.....

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31. Brunswick and Satilla River Route, B. A. White, jr., general manager.	Lessee.....	Lease or rent wharf room or landing privileges from Southern Railway by the month. The same wharf is also rented to the Mallory and the Clyde steamship lines, and our agreement stipulates we are to give way to them when their ships are in port. Depth alongside the dock is about 25 feet.	.....	We have no control over the wharves.	See answer No. 5.
32. L. N. Watson.....	.....do.....	Leases from Atlantic Land and Improvement Company, for sole purpose of shipping lumber and cross-ties as a forwarding agent.	I do not sell any wharfage to any vessel or steamer.	.....	.....
33. Southern Railway Company.	Owner.....	Owns water front in Brunswick Harbor, as shown on blueprint No. 6-622, hereto attached, known as the Turtle River Docks and as City Docks. Wooden wharves and warehouses are erected on the property, as indicated on blueprint. The wharves constitute part of their terminal property at Brunswick, which is used for their own needs in connection with traffic to be handled over their line, on which traffic they secure transportation revenue. The depth of water alongside is usually kept at 18 to 22 feet.	No.....	"It is presumed that these questions are prompted by a complaint which arose during the summer of 1906. A small steamboat called the *Nan Elizabeth* commenced operating between Brunswick and Macon via the Altamaha and Ocmulgee rivers. The company operating that boat made application to us for permission to use our docks at Brunswick on some rental basis. We have provided ourselves with terminals and wharves at Brunswick at a large expense, because they were necessary to the proper handling of business transacted over our line of railroad extending from Brunswick to Macon, Atlanta, and other points. As will doubtless be appreciated, the terminals of a transportation line are the most expensive, and, as a rule, the most crowded portions of its property, and where additional ones are needed the necessary property is always acquired at abnormally high prices. Under these conditions railway companies, of course, can not afford to provide terminals beyond their own needs for traffic passing over their own lines and producing transportation revenue. They can not reasonably allow the use of terminals for mere terminal rental, unconnected with the securing of traffic for transportation. We did not feel that the request on us was one with which we could consistently comply, and it was therefore declined. Nor do we think that we could reasonably have been expected to assent to the proposition. We certainly have no desire to restrict, in any way, the facilities desired by any community in the matter of transportation, or otherwise, whether competitive with us or not, but we do not consider it equitable or reasonable that we should be expected to provide property or facilities for the use and convenience of other transportation lines in which we have no interest and from which we can derive no benefit. We do not feel that in any sense the furnishing of dock facilities at Brunswick to this steamboat, operating between Brunswick and Macon, is a duty resting on us, as we see it, nor that under any reasonable view we should be expected to assent to such an arrangement."	

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BRUNSWICK, GA.

FIRE PROTECTION

Revised, Sept. 1, 1904.
May. 22, 1905.

EXPLANATION

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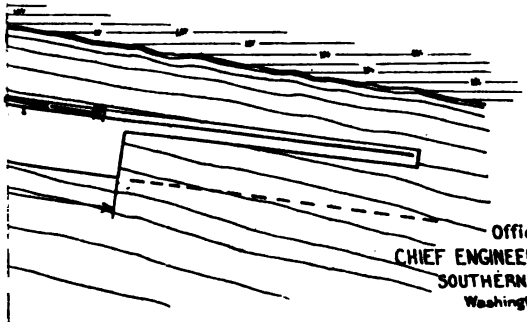

Office of
CHIEF ENGINEER M. W. & S.
SOUTHERN RAILWAY.
Washington, D.C.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 327.

EIGHTMILE RIVER AND EAST BRANCH, CONNECTICUT RIVER, CONNECTICUT.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORTS OF EXAMINATION AND SURVEY OF EIGHTMILE RIVER AND EAST BRANCH, CONNECTICUT RIVER, CONNECTICUT.

DECEMBER 12, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed with accompanying illustration.

WAR DEPARTMENT,
Washington, December 11, 1907.

SIR: I have the honor to transmit herewith a letter from the Acting Chief of Engineers, U. S. Army, dated 10th instant, together with copies of reports from Maj. Harry Taylor, Corps of Engineers, dated May 9 and October 15, 1907, of a preliminary examination and survey, respectively, of Connecticut River, with a view to removing obstructions in Eightmile River and East Branch, in the State of Connecticut, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 10, 1907.

SIR: I have the honor to submit herewith for transmission to Congress reports of May 9, 1907, and October 15, 1907, with map, by Maj. Harry Taylor, Corps of Engineers, on preliminary examination and survey, respectively, authorized by the river and harbor act approved

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March 2, 1907, of Connecticut River, with a view to removing obstructions in Eightmile River and East Branch, in the State of Connecticut.

The plan of improvement presented provides for securing a channel in Eightmile River to the town of Hamburg, having a depth at mean low water of 8 feet and a width of 75 feet, with a small turning basin opposite the town. The cost of this work is estimated at $9,000, with about $1,000 once in ten years for maintenance after completion. For the reasons given no improvement of the East Branch is contemplated.

I concur in the opinion of the district officer, the division engineer, and the Board of Engineers for Rivers and Harbors that Eightmile River is worthy of improvement in the manner indicated above, and that the East Branch is not worthy of improvement by the United States.

Very respectfully,

SMITH S. LEACH,
Acting Chief of Engineers.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF EIGHTMILE RIVER AND OF EAST BRANCH, CONNECTICUT RIVER, CONNECTICUT.

ENGINEER OFFICE, UNITED STATES ARMY,
New London, Conn., May 9, 1907.

GENERAL: In compliance with instructions from your office and the requirements of the act of Congress approved March 2, 1907, I have the honor to submit the following report of a preliminary examination of "Connecticut River, with a view to removing obstructions in Eight Mile River and East Branch."

Eightmile River, otherwise known as Hamburg Cove, empties into the Connecticut River from the east about eight miles above Saybrook Point. East Branch is a small stream which empties into Eightmile River, and is not navigable or capable of being made navigable at any reasonable cost. The inclusion of the East Branch in the item authorizing this preliminary examination appears to have been due to a mistake, as there is no demand for its improvement, and I am informed by those interested in the improvement of Eightmile River that it was not their intention to petition for the improvement of the East Branch.

The entrance to Eightmile River, or Hamburg Cove, is through a comparatively straight channel about 1,700 feet long and 50 feet wide, with a depth of 9 to 10 feet at low water. At the inner end the channel shoals to about 6½ feet for a distance of approximately 200 feet. Beyond this point, extending about half a mile, there is a large body of water, known locally as the "Bay," which has a width of from 700 to 1,200 feet and a depth of from 15 to 25 feet. At the inner end of this bay the channel becomes narrow and shoal, and from this point to the town of Hamburg, a distance of three-fourths of a mile, there are places in the channel where it is so shoal as to prevent navigation by anything but extremely shallow-draft craft.

The legislature of the State of Connecticut, in 1827, chartered the Eightmile River Company with authority to dig and remove obstructions in the Eightmile River for the purpose of widening and deepening the channel to a depth of more than 4 feet and to a suitable width for vessels to pass. The company was authorized to charge toll for

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vessels passing up and down the river, no charge to be made for vessels not drawing over 4 feet of water. There was a graduated scale of charges from that draft up to a draft of 9 feet. This charter was subject to amendment or repeal. Nothing was done by the company for many years prior to 1905, when, by a House joint resolution approved April 12, 1905, the legislature of the State of Connecticut revoked the charter of said company.

Eightmile River is the natural outlet for the farm and timber products of a large territory extending for 8 or 10 miles back of Hamburg village. The nearest railroad station to Hamburg is at Lyme, a station on the New York, New Haven and Hartford Railroad, about 6 miles distant. The road to Lyme is a very poor one, rough and sandy, with many steep hills. In former years, when the Eightmile River was navigable to Hamburg, it is stated that from 40 to 70 vessels of lumber, wood, and ties, etc., were annually shipped from that point, and it is stated that during the year 1889 about 80 vessel loads were shipped, the vessels carrying from 65 to 200 tons each. Last year, 1906, there were 5 large schooner loads of ties shipped, but due to the condition of the channel these schooners could not come above the broad, deep part of the bay, and great inconvenience and considerable extra expense was caused by this fact.

The improvement which is desired is a channel of sufficient depth to permit vessels to reach the dock at Hamburg, and, in my opinion, the locality is worthy of improvement to this extent.

No data are available to enable me to form an estimate of the cost of such work, and for the purpose of obtaining this data it will be necessary to make a survey, which is estimated to cost $100.

Very respectfully, your obedient servant,

HARRY TAYLOR,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

NORTHEAST DIVISION ENGINEER OFFICE,
New York, May 10, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army, concurring in the views of the district officer.

AMOS STICKNEY,
Colonel, Corps of Engineers,
Division Engineer.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., May 20, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

Eightmile River enters the Connecticut River about 8 miles above Saybrook Point. For a distance of about 1,700 feet from its mouth a channel 50 feet wide and 9 to 10 feet deep at low water is available; thence to Hamburg Cove, a distance of about 200 feet, there is a depth of 6½ feet, and in the cove the depths are from 15 to 25 feet. At the inner end of the cove or bay, however, the channel becomes narro

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and from this point to the town of Hamburg, a distance of three-fourths of a mile, shoals obstruct navigation for anything but shallow-draft craft. The improvement desired appears to be the removal of these shoals to permit vessels to reach Hamburg. The district officer believes the locality worthy of improvement to this extent and recommends a survey, which is estimated to cost $100.

It is stated within that in former years, when the river was navigable to Hamburg, from 40 to 70 loads of lumber were annually shipped from that point, but due to the obstruction of the channel in recent years these schooners can not now come above the deep part of the bay. Hamburg has no railroad facilities, and none being conveniently accessible, it is believed that if the water route were opened up it would be generally used for marketing the produce of the immediately tributary country. Whether these benefits would be sufficient to justify the United States in undertaking the improvement can not be determined until the cost of the work is known. The expense of a survey to afford this information being inconsiderable, the Board concurs with the district officer and the division engineer in recommending that a survey be authorized.

The language of the act also requires consideration of the advisability of removing obstructions in East Branch. The district officer states that there is no commercial demand for the improvement of this stream and that it is not susceptible of being made navigable at reasonable cost. In view of these facts, the Board believes that it is not advisable for the United States to undertake the improvement of East Branch, and no survey thereof is recommended.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

[Fourth indorsement.]

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, May 25, 1907.

Respectfully submitted to the Secretary of War.

This is a report on preliminary examination of Eightmile River and East Branch, Connecticut, authorized by the river and harbor act of March 2, 1907.

Inviting attention to the report of the Board of Engineers for Rivers and Harbors in the preceding indorsement, I recommend that a survey of Eightmile River, as proposed, be authorized.

FREDERIC V. ABBOT,
Acting Chief of Engineers.

[Fifth indorsement.]

WAR DEPARTMENT,
May 27, 1907.

Approved.

ROBERT SHAW OLIVER,
Assistant Secretary of War.

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SURVEY OF EIGHTMILE RIVER, CONNECTICUT.

ENGINEER OFFICE, UNITED STATES ARMY,
New London, Conn., October 15, 1907.

GENERAL: I have the honor to forward herewith map of a survey of Eightmile River, Connecticut, made in compliance with your instructions of May 28, 1907, under authority of the act of Congress approved March 2, 1907.

The report of the preliminary examination, submitted under date of May 9, 1907, gives the general condition at this locality and states the reasons why an improvement is desired. The map herewith shows plainly the existing conditions.

To give the relief desired, it is recommended that a channel, as indicated on the map, having a depth at mean low water of 8 feet and a width of 75 feet, be dredged to the wharf at Hamburg, and that a small turning basin opposite this wharf be dredged. The estimated quantity of dredging required for the completion of this improvement is 60,000 cubic yards. The material to be dredged is mainly mud and sand. So far as discovered, no materials of a difficult nature to dredge will be encountered. It is estimated that the work will cost 15 cents per cubic yard, or a total of $9,000 for its completion.

The conditions are such that the cost of maintenance will be little, if anything. The rise and fall of the tide is comparatively small (about 2.9 feet), so that the tidal currents are slight, and the streams emptying into this river carry but very small quantities of sediment and are not subject to excessive rises. It is probable that a sum of $1,000 expended once in ten years will be ample for the maintenance of this improvement after it is completed.

Very respectfully, your obedient servant,

HARRY TAYLOR,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

NORTHEAST DIVISION ENGINEER OFFICE,
New York, October 16, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army.

I deem the Eightmile River, Connecticut, worthy of improvement to the extent herein proposed.

JOHN G. D. KNIGHT,
Colonel, Corps of Engineers,
Division Engineer.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., October 28, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

The district officer suggests as a suitable channel to meet the demands of navigation on this stream one having a width of 75 feet and a depth of 8 feet at mean low water. He estimates the cost of providing such

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a channel at $9,000, and states that its maintenance will probably not exceed $1,000 in ten years. The district officer and the division engineer unite in recommending favorably the improvement proposed.

Believing that the estimated cost of the work is reasonable when compared with the probable resulting benefits to navigation, the Board concurs in the views of these officers, and recommends the adoption of the project as proposed within.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 328.

EAST PEARL RIVER, MISSISSIPPI AND LOUISIANA.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORTS OF EXAMINATION AND SURVEY OF EAST PEARL RIVER, MISSISSIPPI AND LOUISIANA, AT ITS MOUTH.

DECEMBER 12, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 9, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated 6th instant, together with copies of reports from Maj. Henry Jervey, Corps of Engineers, dated June 19 and November 19, 1907, of a preliminary examination and survey, respectively, of East Pearl River, Mississippi and Louisiana, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 6, 1907.

SIR: I have the honor to submit herewith for transmission to Congress reports of June 19, 1907, and November 19, 1907, by Maj. Henry Jervey, Corps of Engineers, upon preliminary examination and survey, respectively, authorized by the river and harbor act approved March 2, 1907, of East Pearl River, Mississippi and Louisiana, with a view to removing bar and restoring channel at its mouth.

In 1899–1900 a channel 9 feet deep at mean low water was dredged at mouth of East Pearl River, but has since shoaled. It is now estimated that to remove this bar and restore the channel to a depth of

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9 feet, with width of 200 feet, will cost $34,000, with about $6,000 per annum for maintenance after completion.

In view of the commercial interests involved, I concur in the opinion of the district officer, the division engineer, and the Board of Engineers for Rivers and Harbors that this locality is worthy of improvement by the General Government to the extent indicated.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATON OF EAST PEARL RIVER, MISSISSIPPI AND LOUISIANA, AT ITS MOUTH.

ENGINEER OFFICE, UNITED STATES ARMY,
Mobile, Ala., June 19, 1907.

GENERAL: In compliance with instructions contained in Department letter dated March 14, 1907, I have the honor to submit the following report upon the preliminary examination of "East Pearl River, with a view to removing bar and restoring channel at its mouth," authorized by the river and harbor act of March 2, 1907.

Previous examinations.—A survey of the channel at the mouth of East Pearl River was made in 1896 with a view to obtaining 17 feet depth at mean low water (printed on page 1729, Annual Report of the Chief of Engineers for 1897). This report stated the opinion that the bar was worthy of improvement to the extent of a channel 300 feet wide and 9 feet deep at mean low water. The plan recommended was adopted in 1899, and the channel completed February 5, 1900, at a cost of about $27,853.92 to June 30, 1901. The condition of the channel previous to this improvement was such as to allow vessels of 7 to 7½ feet draft to ascend the river.

Geographical features.—Pearl River rises in the central eastern part of the State of Mississippi, flows in a southwesterly direction to Jackson, the capital of the State, and then flows in a generally southerly direction to its mouth at the Rigolets, La.

About 40 miles above its mouth Pearl River is divided into two forks. The western fork, through which all the water flows at ordinary stages, is known as West Pearl River, and is entirely within the State of Louisiana; the eastern fork, which is connected with the main stream only by a pass near the mouth, or at high stages, is known as East Pearl River. It flows between the States of Mississippi and Louisiana, emptying into Lake Borgne at Lookout. The total length of East Pearl River is about 40 miles, and its watershed embraces an area of about 450 square miles.

The distance from the mouth of East Pearl River to Gulfport, Miss., is about 30 miles; to New Orleans by Lake Borgne Canal, about 40 miles, and to the Gulf of Mexico by Cat Island channel, about 25 miles.

Resources and commerce.—The commerce to be benefited is mainly [illegible]at originating on East Pearl River, and consists of export timber, [illegible]al stores, and canned oysters. Some timber destined to the east[illegible]d, however, is brought from the West Pearl through a pass into East Pearl, thence across the bar into Mississippi Sound, thus [illegible]aping 5 or 6 miles exposed towing in Lake Borgne.

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The population of the principal towns situated along the stream is as follows:

Dunbar, 2½ miles from the mouth	450
Pearlington, 10½ miles from the mouth	1,000
Logtown, 14 miles from the mouth	1,000
Gainesville, 22 miles from the mouth	300

Gainesville is said to be about the head of navigation.

The river is crossed by the Louisville and Nashville Railroad near its mouth, and by the New Orleans and Northeastern Railroad about 30 miles above.

Situated along the river are 3 shipyards, 5 large sawmills, besides a number of smaller ones; 1 oyster factory, 1 box factory, and a number of general stores.

The natural resources of the country tributary to the river are fine forests of yellow pine, good oyster beds, and large gravel bars. A comparative statement of the approximate commerce passing over the bar in 1905 and 1906 is given below:

	1905.		1906.	
	Tons.	Value.	Tons.	Value.
Lumber and timber	69,581	$800,186.44	126,750	$1,514,500.00
Boxes			250	4,000.00
Naval stores	9,234	560,400.00	4,440	269,460.00
Oysters			20,000	800,000.00
Gravel			36,000	45,000.00
Staves	500	10,000.00		
General merchandise	15,052	697,328.82	4,778	215,010.00
Total	94,367	2,067,915.26	192,218	2,847,970.00

The above figures for 1905 were furnished through the courtesy of Hon. E. J. Bowers, M. C.; and those for 1906 by parties doing business along East Pearl River and by firms that tow timber from both East and West Pearl rivers. They are to be considered approximate only.

The shipments leaving East Pearl River are delivered generally at Gulfport, Miss., and New Orleans, La., about 95 per cent going to Gulfport. Return cargoes are loaded at these two ports.

Nature of improvement desired.—The river channel of East Pearl River is of sufficient depth to accommodate any vessels that can navigate Lake Borgne, namely, 9 feet; but the entrance to the river is now obstructed by a bar over which there is only 7½ feet at mean low tide. The range of tide is about 1½ feet. The improvement desired is the restoration of the channel through the bar to a width of 300 feet and a depth of 9 feet at mean low water.

The channel dredged in 1900 has practically disappeared in seven years, indicating that a dredged channel at this locality will require constant, but not expensive, maintenance.

Conclusion.—The formation of the projected channel in 1900 required the removal of about 97,000 cubic yards of material. There are no continuous records available showing the effect of the improvement upon commerce. The data submitted herein, however, show an increase in 1905 and 1906, and in view of this fact and of the amount of commerce involved, I am of the opinion that the locality is worthy of improvement by the General Government to the extent of restoring the channel over the bar to 9 feet depth at mean low water and 300 feet

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width. A survey to determine the amount of dredging required and the cost of restoring the channel is recommended at an estimated cost of $750.

Respectfully submitted.

H. JERVEY,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

OFFICE DIVISION ENGINEER, GULF DIVISION,
New Orleans, La., June 20, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army, recommended for approval.

E. H. RUFFNER,
Colonel, Corps of Engineers,
Division Engineer.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., July 1, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

At a distance of about 40 miles from its mouth Pearl River divides into two forks, one of which, known as West Pearl River, empties into the Rigolets, while the other, known as East Pearl River, empties into Lake Borgne at Lookout. While the commerce of Pearl River is carried via West Pearl River, through which the water flows at ordinary stages, it appears that within the country tributary to the navigable portion of East Pearl River, extending up to Gainesville, a distance of about 22 miles from the mouth, there originates a commerce of some importance, consisting of export timber, naval stores, canned oysters, etc. Statistics furnished by interested parties, quoted within, indicate that this commerce amounted to about 94,367 tons in 1905, and 192,218 tons in 1906. In the opinion of the Board, this commerce is sufficient to warrant a moderate expenditure for its benefit.

The improvement desired at East Pearl River is the restoration of the channel, 300 feet wide and 9 feet deep at mean low water, which was dredged through the bar at the mouth of the river in accordance with a project adopted in 1899, at a total cost of $27,853.92, this channel having now shoaled to about 7½ feet depth.

From experience heretofore gained in dredging the bar to the dimensions now desired, it is believed that the amount of work required will not be large, but, as definite data are not available, the Board concurs with the district officer and the division engineer in recommending that a survey be authorized, at a cost of $750, to afford essential information as to the cost of the improvement.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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[Fourth indorsement.]

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, July 6, 1907.

Respectfully submitted to the Secretary of War, recommending that a survey be authorized.

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

[Fifth indorsement.]

WAR DEPARTMENT,
July 8, 1907.

Approved.

ROBERT SHAW OLIVER,
Acting Secretary of War.

SURVEY OF EAST PEARL RIVER, MISSISSIPPI AND LOUISIANA, AT ITS MOUTH.

ENGINEER OFFICE, UNITED STATES ARMY,
Mobile, Ala., November 19, 1907.

GENERAL: I have the honor to report that, in compliance with instructions contained in Department letter dated July 10, 1907, a survey has been made of East Pearl River, Mississippi, to determine the cost of removing the bar and restoring the channel at its mouth.

A map[a] showing the result of the survey and a copy of the report of Mr. J. M. Pratt, junior engineer, who directed the field work, are submitted herewith.

Estimates based on this survey indicate that to secure a channel 9 feet deep at mean low water, 200 feet wide, with side slopes of 1 on 5, will require the removal of 122,000 cubic yards of material. This estimate assumes the proposed channel to be located 100 feet east of the line of existing beacons and allows for dredging 1 foot in excess of the stated depth of 9 feet. The estimate for a similar channel 300 feet wide requires the removal of 170,000 cubic yards of material. The dredged channel will be about 5,600 feet long. The estimated cost of dredging the 200-foot channel is about $34,000; of the 300-foot channel, about $47,000.

Based on the fact that the former dredged channel, formed in 1899–1900 by the removal of about 100,000 cubic yards, practically disappeared in less than seven years, it is believed that the annual fill will be about 15 per cent. As an increase in unit price for maintenance dredging, due to the small amount of work, is to be expected, it is considered that the annual cost of maintenance will be not less than $6,000.

Commercial statistics indicate a traffic of more than $2,000,000 value passing over the bar at the mouth of East Pearl River, the bulk of this commerce being lumber and timber towed into Gulfport. The

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[a] Not printed.

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tugs doing the most of the towing draw about 9 feet when coaled up, this being the general available depth at mean low water in Lake Borgne and Mississippi Sound and in the river channel above the bar. To cross the bar it is necessary for these tugs to drag through the soft mud or to await high tide.

In my opinion the commerce to be benefited justifies the removal of the bar and the restoration of the channel to a depth of 9 feet at mean low water, with a width of 200 feet, at an estimated cost of $34,000 for dredging and of $6,000 annually for maintenance.

Respectfully submitted.

H. JERVEY,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

OFFICE DIVISION ENGINEER, GULF DIVISION,
New Orleans, La., November 20, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army, recommended for approval.

E. H. RUFFNER,
Colonel, Corps of Engineers,
Division Engineer.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., December 2, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

As stated in the report on preliminary examination, the channel of East Pearl River is of sufficient depth to accommodate any vessels that can navigate Lake Borgne, namely, 9 feet, but the entrance to the river is obstructed by a bar over which there is only 7½ feet at mean low tide. In the within report the district officer estimates the cost of dredging channels 200 feet and 300 feet wide, both having a depth of 9 feet, at $34,000 and $47,000, respectively, and recommends the channel having a width of 200 feet, the estimated annual cost of maintenance being $6,000.

Inviting attention to the statement of the commerce of this stream contained in the Board's report reviewing that of the district officer on the preliminary examination, the Board is of the opinion that the cost of the proposed improvement is reasonable when compared with the benefits which it will probably afford, and it therefore concurs with the district officer and the division engineer in recommending the adoption of the project contained within for restoring through the bar at the mouth of East Pearl River a channel 200 feet wide and 9 feet deep, at an estimated cost of $34,000.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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REPORT OF J. M. PRATT, JUNIOR ENGINEER.

ENGINEER OFFICE, UNITED STATES ARMY,
Mobile, Ala., November 15, 1907.

MAJOR: I have the honor to submit the following report upon a survey at the mouth of East Pearl River, Mississippi, made in accordance with your instructions, in order to prepare a plan and estimate of cost of improvement and maintenance of a channel across the bar at its mouth:

Work on this survey was commenced August 13, 1907, and was continued when weather conditions permitted until September 11, 1907, at which time the field work of the survey was completed. The results are shown on the accompanying map.

The objects of the survey were:

(*a*) To determine the most economical line of dredging.

(*b*) To ascertain the cost of forming a channel 9 feet deep through the bar from the 9-foot curve of depth in Pearl River to the 9-foot curve in Lake Borgne.

(*c*) To estimate from the condition of the previous improvement and current observations the cost of annual maintenance of such a channel.

The plotting of the notes, the compilation of estimates, and preparation of the final map were in progress during such periods between September 12 and November 15, 1907, as other works of more pressing nature would allow.

The soundings are referred to the plane of mean low water as established by the Coast and Geodetic Survey of 1885-86. The tide gauge used was set on one of the fender piles of the Louisville and Nashville Railroad bridge at East Pearl River, and the bench mark from which this gauge was set is on the eastern side of this river and designated by the Coast and Geodetic Survey as U 1.

In order to discover any error that would occur by this bench mark having been disturbed since first set, simultaneous tidal observations were made for nearly a month between the gauge at East Pearl River and a gauge set at Gulfport while the survey was in progress, and the low-water plane as established at each point checked to within 0.1 foot.

In the report of the preliminary examination dated June 19, 1907, there is a description of the geographical location and the extent of the commerce to be benefited by the contemplated improvement at this locality.

The soundings were made from a gasoline launch and were located by means of sextant and transit angles. A measured base line 8,400.2 feet in length along the Louisville and Nashville Railroad track, the eastern extremity of which was at the eastern end of the Louisville and Nashville Railroad bridge over Pearl River, was used for establishing the necessary triangulation stations.

The material is mostly soft mud, as a pole could be pushed into it 4 or 5 feet with ease, but in places sand and stiff mud were found.

There are two beacons at this locality to the west of the channel, and it is understood they were placed about 200 feet west of the western edge of the channel about three years ago.

The line of deepest water is about 400 feet east of these beacons, but as the difference in cost would be very small, and the interests of navigation would be better served, it is respectfully recommended that the west side of the channel be located 100 feet east of these beacons.

Following are the estimates of the amount of material, place measurement, to be removed in order to obtain a channel 150, 200, and 300 feet wide, respectively, and 9 feet deep, and for forming a channel 300 feet wide and 8 feet deep, the western edge of the channel in each case being 100 feet east of the beacons:

Length.	Bottom width.	Depth.	Amount.
Feet.	*Feet.*	*Feet.*	*Cu. yds.*
5,600	150	9	96,415
5,600	200	9	122,372
5,600	300	9	170,375
4,800	300	8	90,810

The estimated cost of forming channels of these dimensions is as follows:

Channel 150 feet wide and 9 feet deep.

96,415 cubic yards, place measurement, at 25 cents per cubic yard	$24,103.75
Contingencies, 10 per cent	2,410.38
Total	26,514.13

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Channel 200 feet wide and 9 feet deep.

122,372 cubic yards, place measurement, at 25 cents per cubic yard	$30,593.00
Contingencies, 10 per cent	3,059.30
Total	33,652.30

Channel 300 feet wide and 9 feet deep.

170,375 cubic yards, place measurement, at 25 cents per cubic yard	$42,593.75
Contingencies, 10 per cent	4,259.37
Total	46,853.12

Channel 300 feet wide and 8 feet deep.

90,810 cubic yards, place measurement, at 25 cents per cubic yard	$22,702.50
Contingencies, 10 per cent	2,270.25
Total	24,972.75

From November 13, 1899, to February 5, 1900, a channel 300 feet wide and 9 feet deep was formed at this locality by the removal of 96,700 cubic yards of material. (See Annual Report of the Chief of Engineers for 1900, p. 2218.) It would seem that this was measured in scows.

By comparing the map of the present survey with that of the survey made by this office in 1896, we find that the distance from the 9-foot contour in Pearl River to the 9-foot contour in Lake Borgne in 1896 was 4,200 feet and in 1907 was 5,600 feet.

From all these comparisons it would seem that there has been a general shoaling over the bar at the mouth of East Pearl River. But as the accepted plane of mean low water at the different points of improvement in Mississippi Sound has been lowered about 1 foot since the dredging was done at this locality, it is presumed that the higher plane was in use when the previous surveys were made.

In order to prepare an estimate of the cost of maintaining a channel at the mouth of East Pearl River, current observations were made, and the history of the previously dredged channel was traced as closely as possible. The current observations were taken with subsurface floats. During the first part of September, when these observations were taken, the current was found to vary in strength and direction considerably. At ebb tide the general direction was a little east of south in the mouth of the river, but curving more to the eastward and away from the channel before the upper limits of the cut were reached, and varying in velocity from 0.1 to 0.6 mile an hour. At flood tide, with a light southwest wind blowing, the current was generally toward the west, sweeping at times directly across the channel with a velocity ranging from 0.2 to 0.9 mile an hour.

Four hundred feet east of the line of beacons there is a minimum depth along the channel of 7 feet. This is along the line of deepest water. Along lines 300 feet east and west of this line there are minimum depths of about 6 feet. By referring to maps of surveys made previous to the dredging in 1899–1900, it will be seen that the bar in the locality of the channel was practically level. Hence this deep-water line seems to be the remains of the dredged channel. For the first year after the channel was dredged very little shoaling occurred, as stated in the Annual Report of the Chief of Engineers for 1901, which contains the following: "With the exception of the lower part of the channel, which has shoaled about 0.2 of a foot, the depth of 9 feet has been maintained." Since that time, however, it has filled up almost entirely, and it is understood that from an examination made here about two years ago the same depths were found as exist at present. This would indicate that the annual maintenance would be fully as much as 15 per cent of the cost of formation.

In view of the large cost of dredging a channel 300 feet wide and 9 feet deep, it is respectfully recommended that a channel be formed with a width of 200 feet and a depth of 9 feet. Nothing narrower than this is recommended, on account of the difficulty of keeping in a narrow channel on an exposed bar with a tow of loaded barges.

Respectfully submitted.

J. M. PRATT,
Junior Engineer.

Maj. H. JERVEY,
Corps of Engineers.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 329.

SHAWS COVE, NEW LONDON HARBOR, CONNECTICUT.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORTS OF EXAMINATION AND SURVEY OF SHAWS COVE, NEW LONDON HARBOR, CONNECTICUT.

DECEMBER 12, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 9, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated 5th instant, together with copies of reports from Maj. Harry Taylor, Corps of Engineers, dated May 7 and October 19, 1907, of a preliminary examination and survey, respectively, of New London Harbor, Connecticut, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully, ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 5, 1907.

SIR: I have the honor to submit herewith for transmission to Congress reports of May 7, 1907, and October 19, 1907, by Maj. Harry Taylor, Corps of Engineers, on preliminary examination and survey, respectively, authorized by the river and harbor act approved March 2, 1907, of New London Harbor, Connecticut, with a view to securing a depth of 15 feet in Shaws Cove.

The improvement proposed is estimated to cost $12,000, with an average expenditure of $300 per annum for maintenance after completion. I concur in the opinion expressed by the district officer, the

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division engineer, and the Board of Engineers for Rivers and Harbors that the locality in question is worthy of improvement by the General Government in the manner indicated.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF SHAWS COVE, NEW LONDON HARBOR, CONNECTICUT.

ENGINEER OFFICE, UNITED STATES ARMY,
New London, Conn., May 7, 1907.

GENERAL: In compliance with instructions from your office and the requirements of the act of Congress approved March 2, 1907, I have the honor to submit the following report of a preliminary examination of "New London Harbor, with a view to securing a depth of 15 feet in Shaws Cove."

Shaws Cove is a small portion of New London Harbor lying on the west side of the harbor, between the main part of the city of New London and Fort Trumbull. The entrance to the cove, which is near its north end, is crossed by the New York, New Haven and Hartford Railroad on a swing drawbridge, which has a clear opening between the center pier and the abutments of 50 feet on each side, but, due to the construction of the fenders, the available clear opening is reduced to approximately 43 feet. Inside of the drawbridge the dimensions of the cove are approximately 1,100 feet long, north and south, between pierhead lines, 300 feet wide between pierhead lines at the south end, and 650 feet between pierhead lines at the north end. The distance from the drawbridge to deep water in New London Harbor is approximately 300 feet.

The act of July 13, 1892, authorized the expenditure of part of the money appropriated for the improvement of the Thames River, Connecticut, for dredging in Shaws Cove. Under the authority granted by this act a total of $21,000 has been allotted from the appropriations for the improvement of the Thames River made by the acts of July 13, 1892, August 18, 1894, and March 3, 1899, and with the funds thus allotted the entire area of the cove between pierhead lines has been dredged to a uniform depth of 12 feet, with the exception of a very small area in the northwest corner of the cove where rock rises above the depth of 12 feet.

Situated on the cove are three coal yards, one lumber yard, and one stone yard, which receive their supplies by water. At the south end of the cove is located a foundry, the owners of which state that if there were sufficient depth they would also receive coal and iron by water. The commerce of the cove for the calendar year 1906, as reported by the coal, lumber, and stone yards, amounted to 20,829 tons, valued at $126,912.70. The main industry, however, on Shaws Cove is the repair of and caring for pleasure yachts which are laid up here during the winter, almost the entire west side of the cove being lined with wharves which are devoted to this business.

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The commerce of this cove is increasing, and, due to the draft of vessels now bringing coal, lumber, and stone to this port, the increase of depth asked for is necessary.

The data in this office are not sufficient to enable me to make an estimate of the cost of deepening the cove from 12 feet, the existing depth, to 15 feet, as it is probable that since the last dredging, which was done several years ago, there has been some filling, although the conditions are such that this should be inconsiderable in amount.

The estimated cost of a survey is $50.

In my opinion the locality is worthy of further improvement by the General Government.

Very respectfully, your obedient servant,

HARRY TAYLOR,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

NORTHEAST DIVISION ENGINEER OFFICE,
New York, May 8, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army, concurring in the opinion of the district officer.

AMOS STICKNEY,
Colonel, Corps of Engineers,
Division Engineer.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., May 13, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

Prior to the inception of work by the United States in Shaws Cove, the depths at mean low water ranged from 2½ to 8 feet, averaging about 4 feet. By the expenditure of about $21,000, the larger part of the cove was deepened to 12 feet at mean low water, and while some shoaling may have since occurred, it would appear probable that the work required to provide a depth of 15 feet would be small and its cost moderate. Definite data for determining the cost of the work, however, are not available, and for this purpose the district officer recommends that a survey be authorized at a cost of $50.

In the within report it is stated that the commerce of the cove for the year 1906 amounted to 20,829 tons, valued at $126,912.70, and that the proposed increase of depth is desired to afford facilities suitable for the class of vessels now bringing coal, lumber, and stone to this port. While the commerce involved is not large, the Board believes that the locality may be worthy of some further improvement by the United States, and it therefore concurs with the district officer and the division engineer in recommending that a survey be made for the purpose of affording knowledge as to the cost of the work contemplated by the act ordering this examination

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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[Fourth indorsement.]

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, May 16, 1907.

Respectfully submitted to the Secretary of War.

This is a report on preliminary examination of Shaws Cove, New London Harbor, Connecticut, authorized by the river and harbor act of March 2, 1907.

Inviting attention to the report of the Board of Engineers for Rivers and Harbors in the preceding indorsement, I recommend that a survey of the locality to determine the advisability of the improvement, as proposed, be authorized.

FREDERIC V. ABBOT,
Acting Chief of Engineers.

[Fifth indorsement.]

WAR DEPARTMENT,
May 17, 1907.

Approved as recommended by the Acting Chief of Engineers.

ROBERT SHAW OLIVER,
Assistant Secretary of War.

SURVEY OF SHAWS COVE, NEW LONDON HARBOR, CONNECTICUT.

ENGINEER OFFICE, UNITED STATES ARMY,
New London, Conn., October 19, 1907.

GENERAL: I have the honor to forward herewith map[a] of a survey of Shaws Cove, New London Harbor, Connecticut, made under authority of the act of Congress approved March 2, 1907, in compliance with your instructions of May 20, 1907.

My report of a preliminary examination of this locality, submitted under date of May 7, 1907, gives the general condition at this locality and states the reasons why an improvement is desired. The map shows plainly the existing conditions.

The dredging in this section of New London Harbor was completed to project depth of 12 feet in 1899; in 1905, 11,095 cubic yards was removed under a contract for dredging for maintenance. The portion of the harbor which was redredged in 1905 has maintained its depth practically to the full project depth; the other sections of the harbor have shoaled somewhat, so that at the present time it is estimated that the removal of 6,000 cubic yards of material will be necessary to restore the area originally dredged to the full project depth of 12 feet.

To increase the depth to 15 feet at low water, as now desired, will require an additional amount of dredging of 62,000 cubic yards. This, at an estimated price of 17 cents per cubic yard, will cost $10,540. There is a small point of rock near the northeast corner of the cove which it is estimated will cost $500 additional to remove, or a total of $11,040 in addition to the amount required for maintenance of the old project; and for maintenance, to restore the present project, 6,000 cubic yards, at 17 cents, a total of $1,020, or a grand total for the

[a] Not printed.

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entire dredging to secure a depth of 15 feet, in round numbers, of $12,000.

The amount which has been spent in maintenance since the completion of the project in 1899, added to that now estimated to restore the entire basin to full project depth, amounts to $2,684.25. The increase of the depth to 15 feet will make no appreciable difference in the cost of maintenance, and it is therefore estimated that $3,000 spent once in ten years will be ample for the maintenance of this project after completion.

Very respectfully, your obedient servant,

HARRY TAYLOR,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

NORTHEAST DIVISION ENGINEER OFFICE,
New York, October 23, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army, concurring in the opinion expressed by my predecessor, May 8, 1907, that Shaws Cove is worthy, to the extent proposed, of further improvement by the General Government.

JOHN G. D. KNIGHT,
Colonel, Corps of Engineers,
Division Engineer.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., October 28, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

From the district officer's report on a survey of Shaws Cove, New London Harbor, and the map accompanying, it appears that to restore the present project depth of 12 feet will require the removal of about 6,000 cubic yards, at a cost of about $1,000, and that to increase the harbor depth to 15 feet, as contemplated in the act, will cost about $11,000 additional, or a total of about $12,000, and that the improvement can then be maintained by the expenditure of $3,000 at intervals of ten years, or an annual expenditure of $300.

Believing that the advantages to be gained by the increased facilities proposed will bear a fair relation to the cost, the Board concurs with the district officer and the division engineer in recommending the adoption of the project outlined within at an initial cost of $12,000.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 330.

YOUGHIOGHENY RIVER, PENNSYLVANIA.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF YOUGHIOGHENY RIVER TO CONNELLSVILLE, PA.

DECEMBER 12, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 9, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated December 5, 1907, together with copy of a report from Maj. H. C. Newcomer, Corps of Engineers, dated October 10, 1907, of a preliminary examination of Youghiogheny River to Connellsville, Pa., made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 5, 1907.

SIR: I have the honor to submit herewith, for transmission to Congress, report of October 10, 1907, by Maj. H. C. Newcomer, Corps of Engineers, on preliminary examination of Youghiogheny River to Connellsville, Pa., authorized by the river and harbor act of March 2, 1907.

From the facts and for the reasons given, I concur in the opinion of the district officer, the division engineer, and the Board of Engineers

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for Rivers and Harbors that this locality is not worthy of improvement by the General Government.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF YOUGHIOGHENY RIVER TO CONNELLSVILLE, PENNSYLVANIA.

ENGINEER OFFICE, UNITED STATES ARMY,
Pittsburg, Pa., October 10, 1907.

GENERAL: I have the honor to submit the following report of preliminary examination of "Youghiogheny River to Connellsville," as provided for in the river and harbor act of March 2, 1907.

There have been several reports hitherto upon this river, which have been published in the Annual Reports of the Chief of Engineers, as follows:

Annual Report, 1874, Part I, page 558, survey from mouth to West Newton, 19 miles.
Annual Report, 1876, Part II, page 83, survey from West Newton to Connellsville, 25 miles.
Annual Report, 1881, page 1957, examination from mouth to Connellsville, based mainly on preceding surveys.
Annual Report, 1884, page 1716, examination from mouth to Connellsville, being practically a repetition of the preceding report.
Annual Report, 1900, page 3283, examination from mouth to West Newton, based partly on former surveys and partly on further investigation.

The last report was made by Major Powell and the earlier ones by Colonel Merrill. They all appear to favor improving the river, though the question as to worthiness of the improvement was not especially discussed by Colonel Merrill. The present examination was intrusted to Capt. E. M. Adams, Corps of Engineers, and he has gone into the matter very carefully. The following quotations covering the body of his report are submitted:

The examination was begun in March, 1907. Requests for data and invitations to present views were addressed to industrial and mining companies operating in the Youghiogheny Valley, to prominent shippers from the valley, to the chambers of commerce of McKeesport and West Newton, and to the railroad companies operating in the valley. Circular letters were posted in all post-offices, inviting all persons interested to present their views.

During August, 1907, a party of two was sent to Connellsville; this party descended the river from Connellsville to McKeesport, gathering information as to industrial and mining conditions.

I have, in person, made two trips from McKeesport to Connellsville and return, and one trip from McKeesport to Jacobs Creek and return.

On August 18, 1907, additional circular letters were sent to industrial and mining companies which had not been included among those addressed in March.

The information presented in this report is derived from the sources indicated above and from the official records of the Corps of Engineers, of the United States Geological Survey, and of the Pennsylvania State bureau of mines.

PHYSICAL CHARACTERISTICS.

The Youghiogheny River has its origin in the confluence of several small streams which drain mountain areas of Maryland and West Virginia; from the point of junction of these streams the river flows north and west into Pennsylvania, and eventually empties into the Monongahela River at McKeesport. From its source to Connellsville the river has the character of a turbulent mountain stream; the slope is great; there

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are numerous rapids and sudden descents; the valley is narrow, with steep, mountainous sides and frequent gorges. From Connellsville to the mouth, which is the portion immediately under consideration, the river may properly be divided into two sections, that from Connellsville to West Newton, and that from West Newton to the mouth at McKeesport. These two sections show a marked difference in character.

In the upper, or Connellsville-West Newton, section, the valley broadens somewhat, but retains the general character indicated as existing above. The banks are high and steep; there is little level land. The total fall in this section, 25.6 miles long, is 122.6 feet (an average of 4.8 feet per mile), distributed as follows:

	Miles.	Feet per mile.
Connellsville to Sedgwick	4.83	6.00
Sedgwick to Dawson	1.23	1.50
Dawson to Layton	7.10	6.40
Layton to West Newton	12.40	3.73

Entering upon the lower, or West Newton-McKeesport, section, the valley and river broaden; the banks are less steep, and in part alluvial; larger tracts of level bottom land are found; and the slope of the river is much decreased. In this section, 18.85 miles long, the total fall is 25.4 feet, distributed as follows:

	Miles.	Feet per mile.
West Newton to Guffey	8.71	2.03
Guffey to Alpsville	3.10	2.58
Alpsville to McKeesport	7.04	(a)

a Level pool.

It should be noted that the whole valley is subject to sudden and severe floods and to ice gorges. The following flood heights, which are extreme, have been observed:

	1897.	1907.		1897.	1907.
Fuller	.....	23.0	Snyder	16.0	.....
Whitsett	13.0	.....	West Newton	20.0	31.0
Wick Haven	.....	19.5	Suterville	22.0	28.0
Jacobs Creek	10.0	24.6	Buena Vista	26.5	30.0
Smithton	14.0	23.6	Coultersville	28.5	30.0
Port Royal	17.0	28.0	Boston	29.0	32.5
Cedar Creek	.....	27.0	McKeesport	28.5	30.0

No measurements to determine the discharge during these flood stages have been made. Measurements of the low-water discharge, which are believed to be reliable, have been made. These indicate that, excepting in extremely dry seasons, there may be expected in the Connellsville–West Newton section a low-water discharge of 100 cubic feet per second and in the West Newton–McKeesport section 125 cubic feet per second.

Map A, submitted herewith,[a] shows the river from Connellsville to West Newton, with profile, as compiled from the Sedgwick survey of 1874, with additions. Map B[a] shows the river from West Newton to McKeesport, with profile, as compiled from the Mahan survey of 1873, with additions. The Mahan and Sedgwick surveys show a discrepancy as to elevations. As the notes of these surveys are not available, it has been impossible to reconcile the different elevations shown at West Newton, but each profile is believed to be correct in itself and the small discrepancy is not significant for the purpose of preliminary examination.

[a] The maps accompanying the report of Captain Adams were not forwarded by Major Newcomer, as it was considered hardly necessary to publish them in connection with this inquiry. The maps of the United States Geological Survey for the Pittsburg, Brownsville, and Connellsville quadrangles cover the region under consideration.

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ECONOMIC CONDITIONS.

(a) *Mineral resources.*—A generalized columnar section showing the geologic structure of the region will be found on Map C.

Coal is the most important product. The columnar section shows several strata of coal and indicates their character. The present operations are for the greater part in the Pittsburg vein and will continue so until exhaustion of that vein is reached. The outcrop limits of the Pittsburg vein in the Youghiogheny Valley are shown on Map C.

The area covered by Map C is that portion of the Youghiogheny watershed which lies within 5 miles of the portion of the river under consideration. The distance of 5 miles is determined by the fact that coal operators seem to agree that coal lying at a greater distance can not economically be delivered to water transportation. Nothing beyond the area shown can be considered as tributary to any future navigation upon the river.

It will be seen that from Connellsville to Dawson (about 6 miles) the river crosses the Connellsville basin of the Pittsburg vein. In this section of the valley coking coal of the highest grade is mined. Columnar section A, Map C, shows the structure at Leisenring 1, which is typical; columnar section B, Map C, shows detailed structure of the Pittsburg vein at the same mine. The following table shows the production of the tributary portion of the Connellsville basin for the year 1905, the amounts shipped to market as coal, the amounts coked prior to shipment, the amounts of coke produced and shipped being shown in separate columns:

Connellsville basin, 1905.

	Coal shipped to market.	Coked prior to shipment.	Coke shipped to market.	Ovens.
	Tons.	*Tons.*	*Tons.*	*Number.*
Adelaide	26	298,137	198,500	375
Atlas	.....	208,723	161,049	210
Basil	9,900	.....	.....	.....
Clarissa	2,446	77,490	58,892	108
Davidson	2,684	231,296	154,000	333
Dexter	.....	13,823	10,345	40
Elm Grove	.....	134,168	93,364	218
Fort Hill	.....	242,853	161,902	186
Franklin	11,884	37,160	26,557	50
Ferguson Hill	37,603	.....	.....	.....
Furnace	199,260	.....	.....	.....
Grace	.....	146,968	97,980	330
Henry Clay	.....	102,612	68,500	120
Juniata	.....	216,300	135,187	250
Kendall	.....	8,612	5,000	50
Leisenring 1	2,305	361,899	241,000	500
Leisenring 3	.....	352,570	235,000	504
Mahoning	940	105,150	80,238	.....
Nellie	.....	224,268	218,618	329
Painter	.....	164,875	110,000	223
Paul	.....	364,733	273,550	499
Pennsville	.....	52,232	42,227	92
Rist	.....	255,115	170,000	.....
Spring Grove	.....	52,800	35,200	61
Sterling 2	.....	.....	.....	252
Summit	4,237	45,140	30,000	42
Tiptop	1,502	85,848	57,000	121
Trotter	.....	366,057	244,000	464
Valley	.....	219,407	146,000	251
White	.....	141,087	94,000	200
Total	272,847	4,509,313	3,148,109	5,903

From Dawson to Perryopolis and Jacobs Creek (about 12 miles) the valley crosses the Fayette anticline. In this section the Pittsburg coal has been eroded, and the barren measures of the Conemaugh formation are exposed.

At Perryopolis and Jacobs Creek the river again enters the Pittsburg coal region, and continues to traverse the productive measures of the Monongahela formation until the mouth of the river is reached (about 26 miles).

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The coal which is found south of West Newton is generally classed as steam coal, though part of it is used for the production of coke; columnar section C, Map C, shows the structure of the Pittsburg vein at Banning. Production for the region Perryopolis–West Newton for the year 1905 is shown below:

West Newton-southern basin, 1905.

	Coal shipped to market.	Coked prior to shipment.	Coke shipped to market.	Ovens.
	Tons.	*Tons.*	*Tons.*	*Number.*
Banning 2	535,583			
Victoria	155,945			
Washington 1	397,850	347,555	331,704	500
Washington 2	237,336	415,593	277,062	500
Washington 3	179,443			
Wick Haven	98,482			
Banning 1	377,879			
Clair	36,000			
Darr	430,734			
Euclid	156,131	21,785	14,019	
Eureka	197,617			
Waverly	160,612	36,533	25,190	
Total	2,953,612	821,466	647,975	1,000

From West Newton downstream to the limit of the area covered by the Pittsburg vein the coal is of character suited to the manufacture of gas, and is so classed. The production for 1905 is shown in the following table:

West Newton-northern basin, 1905.

	Coal shipped to market.	Coked prior to shipment.	Coke shipped to market.
	Tons.	*Tons.*	*Tons.*
Amyville	4,500		
Ayers Hollow	30,000		
Criterion	86,618		
Guffey	28,909		
Keystone	240,859		
Ocean 1[a]	191,625		
Ocean 1[b]	452,645		
Penn Gas 3	322,225	57,420	33,386
Shaner	145,673		
West Newton Shaft	184,430		
Youghiogheny Slope	131,581		
Dravo	80,000		
Forest Hill	271,567		
Guiler	81,452		
Ocean 2[a]	302,432		
Ocean 3[a]	130,673		
Ocean 5[a]	23,984		
Osceola	111,486		
Painter	155,777		
Sarah	10,532		
Youghiogheny 2	200,856		
Total	3,277,824	57,420	33,386

[a] Pittsburg Coal Company. [b] Ocean Coal Company.

Other mineral resources of the valley are fire clay, limestone, and sandstone, which are found in large quantities. The fire clay is utilized in the manufacture of large quantities of fire brick, as noted later under industrial conditions.

(*b*) *Industrial conditions.*—The industrial development of the valley is not at present extensive; the region of greatest activity lies in the vicinity of McKeesport, where slack water exists. The following plants are in operation; average annual figures are shown.[a]

[a] Here Captain Adams gives a list of 39 plants having an aggregate value amounting to $4,733,004, with total output of 291,271 tons and import of 184,550 tons per year.

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With reference to prospective industrial conditions, the advocates of improvement urge that if 7-foot navigation to West Newton were provided, great impetus would be given to the industrial development of this section. Examinations show that the areas of level land in this section, available for the erection of industrial plants, aggregate about 950 acres; slack water to West Newton might lead to the occupation of these sites by mills and factories. Examination of the Connellsville-West Newton section shows that, except in the immediate vicinity of Connellsville, available factory or mill sites are so few and so small that it is not likely that slack water in that section would lead to the establishing of industrial plants.

(*c*) *Agricultural resources.*—The agricultural resources of the valley are small; cultivation of the soil is limited, and it is not likely to increase; shipments of produce are not, and are not likely to be, of sufficient volume to merit consideration in connection with the question of improvement of the Youghiogheny River.

(*d*) *Transportation.*—The present facilities for transportation to and from the valley are as follows:

The Baltimore and Ohio Railroad enters the valley from the south and east above Connellsville, runs down the right bank of the Youghiogheny to McKeesport, and thence to Pittsburg. Branches leave the main line at Connellsville, running to New Haven, Uniontown, Point Marion, and Masontown; Broadford running to Scottdale and Mount Pleasant; short spurs run to various mines and coke ovens.

The Youghiogheny division of the Pittsburg and Lake Erie Railroad branches from the Monongahela division at McKeesport; runs up the left bank of the Youghiogheny to Connellsville; short spurs run to various mines and coke ovens.

The Scottdale and Redstone branches of the Pennsylvania Railroad tap the valley at Connellsville–New Haven, the Irwin and Sewickley branches at Gratztown.

Slack water on the lower Youghiogheny, backed up by Dam 2, Monongahela River, enables craft drawing 5 feet to navigate between McKeesport and Alpsville, 7 miles above.

(*e*) *Present traffic.*—To arrive at an accurate estimate of the present import, export, and local traffic of the valley is a matter of great difficulty. The records of the railroads are not kept in such form as to permit of ready tabulation in the form required for this examination. By inspection of all railroad freight records to which access could be had, the following results were secured:

The export traffic consists principally of coal and coke; all other classes of freight combined form but a small percentage of the total. For this reason the traffic is here divided into three classes, i. e., coal, coke, and merchandise. In the table below are shown exports for the calendar year 1906. For the purpose of this examination the totals are divided according to destination, showing whether the freight, as at present distributed, could or could not be delivered by water in case of the improvement of the Youghiogheny River.

Pittsburg and Lake Erie Railroad.

	To river points.	To inland points.
	Tons.	*Tons.*
Coal	252,444	3,435,566
Coke	114,729	2,956,233
Merchandise	58,138	6,176

Baltimore and Ohio Railroad.

	To river points.	To inland points.
	Tons.	*Tons.*
Coal	17,611	1,371,115
Coke	14,145	727,174
Merchandise	38,944	157,597

The import and local traffic consist of small deliveries of coal and coke to plants in the lower part of the valley, of raw material and machinery to factories, and of general merchandise.

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ing a t... IMPROVEMENT IN THE PAST.

Improvement of the Youghiogheny River was begun in 1848; prior to that time slack water existed from McKeesport to the mouth, to Alpsville, 7 miles above, this slack water being backed up by the construction of Dam 2, Monongahela River.

In 1848 a private corporation, chartered by the State of Pennsylvania, undertook the construction of two dams with locks, the purpose being to extend the slack-water system upstream from Alpsville to West Newton. These dams were completed, but, by reason of poor construction, failed to secure the desired result; in 1865 they were badly damaged by flood and ice and were abandoned.

Since 1865 no provision for the improvement of the river has been made; it is now navigable for craft drawing 5 feet from McKeesport to Alpsville (about 7 miles).

POSSIBLE FUTURE IMPROVEMENT.

(*a*) *Probable character.*—Any project for the improvement of the Youghiogheny River should contemplate securing a navigable depth equal to that provided in the Monongahela River; the proper method for securing this is found in construction of locks and dams by which the Monongahela slack-water system shall be extended up the Youghiogheny Valley.

The fall from West Newton to the mouth of the river at McKeesport is 25.4 feet; to extend the slack-water system up to West Newton will require the construction of three locks and dams, with a lift of 10 feet at each. * * *

The fall from Connellsville to West Newton is 122.6 feet; to extend the slack-water system from West Newton up to Connellsville will require the construction of twelve lock and dams, with a lift of 10 feet at each. * * *

There will be required, in addition, a certain amount of dredging and rock removal.

* * * * * * * *

(*b*) *Benefits to be secured by improvement.*—The interests which may be benefited by improvement are: Shippers of coal and coke from the Connellsville basin; shippers of coal and coke from the West Newton basins, southern and northern; shippers and importers of merchandise in the Connellsville-West Newton section; shippers and importers of merchandise in the West Newton-Greenock section; landowners in the West Newton-Greenock section.

That portion of the river lying below Greenock is omitted from consideration for the reason that slack water from McKeesport up to Alpsville is now available.

Considering these interests in the order named:

Shippers of coal and coke from the Connellsville basin.—By reference to the table of coal and coke production for the Connellsville basin, it will be noted that for 1905 the total production of coal was 4,782,160 tons; that of this amount only 272,847 tons were shipped to market as coal; that 4,509,313 tons were coked prior to shipment and shipped to market as 3,148,109 tons of coke

The coal operators seem to agree that coke should not be shipped by water, on account of the deterioration of the coke in transit. They also seem to agree that coke should be shipped by such route that no rehandling will be required; this also on account of incident deterioration. Coke shipments are therefore essentially railroad shipments.

Inspection of previous reports of production and information secured from coal operators indicate that the total production for 1905 may be taken as typical; that average annual production can not be expected greatly to exceed these figures; that production at this rate from the tributary area may be expected for a limited number of years only. Coal operators also indicate that the coke ovens of the tributary area are adequate to the coking of the product; that a navigable condition of the river would not cause abandonment of these ovens; that, though a navigable condition were secured, no great change might be expected in the present conditions of coal production and shipment. This, together with the fact that none of the large coke shippers of the district make any reply whatsoever to invitation to present their views, eliminates the items of coke shipments from the consideration of the advisability of improvement. For the summary below I retain only the item 272,847 tons shipped to market as coal.

Shippers of coal and coke from the West Newton-southern basin.—Reference to the table for this region will show that the total production for 1905 was 3,775,078 tons; that of this amount 2,953,612 tons were shipped to the market as coal; that 821,466 tons were coked prior to shipment and shipped as 647,975 tons of coke. The average annual production will not exceed these figures. Production at this rate may be expected for a period of possibly twenty years. As regards the interest shown by the shippers from this section, it may be said that but one company has replied to inquiries; that this company, one of the largest, has taken pains to disavow advocacy of the improvement of the Youghiogheny, stating that they would derive no benefit therefrom. For the summary below I retain the 2,953,612 tons shipped to the market as coal.

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Shippers of coal and coke from the West Newton-northern section.—The table for this region shows a total production during 1905 of 3,335,244 tons, the advance of this amount 3,277,824 tons were shipped to market as coal; 57,420 tons were coked prior to shipment and shipped as 33,386 tons of coke. Here again coal and coke indicate that the limit of production has been reached; it is to be expected that the coal and coke annual production will decrease rather than increase; large areas in this region have been mined out.

As stated heretofore, the coal of this region is classed as gas coal. It appears that this coal is marketed largely in the Great Lakes region and in the Eastern States; only a small portion of it appears to be delivered within reach of water transportation. Of companies operating in this region none manifest any interest whatsoever in the possible improvement of the river. For the summary I retain the 3,277,824 tons shipped to market as coal.

Summary of coal shipped to market, 1905.

	Tons.
From Connellsville basin	272,847
From West Newton-southern basin	2,953,612
From West Newton-northern basin	3,277,824
Total	6,504,283

In determining the consideration to be given to the coal shipments shown above there now arises the question of the present and propective destination of such shipments. As the coal records for 1906 have not yet been published, and as the railroad records for 1905 are difficult of access, I apply the railroad records for 1906, which are normal, as a criterion.

Coal shipments, 1906.

	To river points.	To inland points.
	Tons.	*Tons.*
Pittsburg and Lake Erie Railroad	252,444	3,435,566
Baltimore and Ohio Railroad	17,611	1,371,115
Total	270,055	4,806,681

Records furnished by the Pennsylvania Railroad, while not susceptible of reduction to the form shown above, account for the remaining shipments and indicate similar distribution. On this basis about 5½ per cent of the total shipment is dispatched to points which could be reached by water transportation were the Youghiogheny River improved.

As to prospective destination of coal shipments, advocates of the improvement urge that navigability of the Youghiogheny would radically modify the distribution shown above; that were these shippers able to reach the river market enjoyed by the Monongahela shippers they would turn to that market as their primary outlet.

I believe that such would not be the case. Records of shipments from a similar area tributary to the Monongahela River show that of the total output only 40 per cent is shipped by river; this in spite of the facts that the Monongahela coal is suited to general uses, and that the shipping facilities are unusually good. The proportion of shipments by water in the Youghiogheny Valley would fall much below the proportion of such in the Monongahela Valley by reason of the special character of the Youghiogheny coal, by reason of the inferior character of shipping facilities even with the most extensive possible improvement, and by reason of long-term engagements, known to exist, under which the Youghiogheny shippers will for years to come continue to deliver to the market heretofore created. This belief is certainly supported by the total lack of interest evinced by coal operators, large and small. It is highly improbable that more than 5 per cent of the production would be diverted to water shipment.

In the final statement of the financial aspect of the proposed improvement I shall therefore include 5 per cent of the coal shipments, or 325,214 tons.

Shippers and importers of merchandise in the Connellsville-West Newton section and in the West Newton-Greenock section.—The industrial output appears to be 222,200 tons; the import, 103,600 tons. The output greatly exceeds the import, for the reason that a large part of the output consists of fire brick, the raw material for which is mined in the valley.

The railroad records for 1906 show that of the total export of merchandise about 38 per cent was shipped to points which could, in the event of improvement of the Youghiogheny River, be reached by water transportation; they show that the total import of merchandise, including foodstuffs, considerably exceeded the import figures

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given above, reaching a total of approximately 280,000 tons, but that of this total only 24 per cent was imported from points accessible by water.

Whether the present distribution of export and source of import would be materially modified by improvement of the river is problematic.

For the final statement of the financial aspect I retain as exports 84,436 tons, as imports 67,200 tons.

Landowners in the West Newton-Greenock section.—The owners of the land which lies on the river banks below West Newton and which is suited to the erection of manufacturing plants might be largely benefited by the improvement of the Youghiogheny River. Slack water extending up to West Newton might lead to an industrial development similar to that now found in the vicinity of Versailles. The demand for the available sites might produce a large increment in the present value of such sites. This prospect is very fully set forth in the statements submitted by the pronounced advocates of the improvement—in fact, engages far greater interest than any other feature of the aspect.

Reduced to primary considerations, the accessibility or inaccessibility of 950 acres of building sites upon the banks of the Youghiogheny, while a matter of urgent pecuniary interest to the owners of those sites, does not appear to be a matter of vital concern to the United States.

Captain Adams next discusses the financial aspect of the question and arrives at the conclusion that the benefit to commerce would not be sufficient to justify the expense of canalizing the river, either to West Newton or to Connellsville. He emphasizes particularly the fact that the coal operators evince no interest in the proposed improvement. In fact, some of them advise against it as an extravagant waste of money and none are willing to say that they would derive any benefit from it.

As the transportation of coal from this field is the only source from which any considerable commerce could at present be expected on the improved river, as the probable contribution from this source is not large, and as there is an entire lack of interest in the project on the part of the coal shippers, it would appear that there is no urgent commercial need for the proposed improvement, and I therefore concur with Captain Adams in his adverse conclusion. I am inclined to attach greater commercial importance to the possible development of favorable sites for manufacturing plants, but I do not consider that there is sufficient reason for undertaking the improvement of the Youghiogheny River for this purpose at the present time.

I have therefore to report that, in my opinion, this locality is not worthy of improvement by the General Government.

Very respectfully, your obedient servant,

H. C. NEWCOMER,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

ENGINEER OFFICE, U. S. ARMY, CENTRAL DIVISION,
Detroit, Mich., October 17, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army, concurring in the opinion of the district engineer that the Youghiogheny River is not worthy of improvement to Connellsville, Pa., by the General Government.

G. J. LYDECKER,
Colonel, Corps of Engineers,
Division Engineer, Central Division.

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[Fifth indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., November 25, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

Reference is made within to several reports previously submitted upon the improvement of the Youghiogheny River. The one last mentioned, that published in report for 1900, page 3283, contains a careful résumé or digest of the several reports referred to, and it does not appear necessary to go further into past history in this report.

The stretch of river under consideration, 44.4 miles in length, is naturally divided into two sections—the upper section, from Connellsville to West Newton, 25.6 miles, with a fall of 122.6 feet, an average of 4.8 feet per mile, requiring twelve locks and dams for its improvement; and the lower section, from West Newton to McKeesport at the mouth of the river, 18.8 miles, the fall being 25.4 feet, or 1.3 feet per mile, necessitating for its improvement three locks and dams. The whole valley is subject periodically to sudden and severe floods and ice gorges. The low-water discharge is reported in the lower section at 125 cubic feet per second, and in the upper section at 100 cubic feet. The valley is narrow, the adjacent country being hilly and mountainous.

Above West Newton factory or mill sites are very few, while in the lower section the available area for industrial development is greater, being estimated by the district officer at 950 acres. Owing to the character of the country there is practically no agricultural development in this section and this industry has no bearing upon the proposed improvement. The principal resources of the locality are coal, coke, fire clay, limestone, and sandstone. The present transportation facilities consist of a railroad on each bank of the river and slack water from Dam No. 2 on the Monongahela River in the lower 7 miles of the river.

Owing to the great fall in the upper section and the consequent enormous expenditure that would be necessary for its improvement, coupled with the fact that there is little room for commercial industries and the apparent lack of interest in securing navigation facilities here, the improvement of this section seems to be out of the question. The principal demand for improvement is confined to the lower section, where the fall is less and the adjacent country susceptible of greater commercial development.

The district officer makes a careful anaylsis of the commercial situation, from which it appears that the total commerce is quite large, approximating perhaps about 9,000,000 tons, the principal items of which are coal, coke, and merchandise. Those interested in the production and shipment of coal expressed but little interest in the improvement, it being stated that only a very small portion of the output would be handled by water if the improvement contemplated were effected, and the item of coke is entirely eliminated from consideration for the reason that it deteriorates in shipment by water, and those interested state that none of this commodity would be so shipped. The analysis appears to indicate that not to exceed 5 per cent of the coal production might be diverted to water shipment, the amount being placed at 325,214 tons, and the amount of merchandise that might be handled by water is placed at 151,636 tons. What part of this

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commerce would actually be diverted to the river if the improvement were effected is a matter of conjecture, there being no water transportation at present except on the lower 7 miles. The district officer and the division engineer conclude that the locality is not worthy of improvement.

At the request of the Chamber of Commerce of the city of McKeesport the Board held a hearing in its office in Washington on November 18, 1907, which was attended by Hon. John Dalzell, Member of Congress, Dr. T. L. White, and Messrs. M. H. Scholl, A. H. Kelly, and J. B. Ayres. It appears from statements made by these gentlemen that the area available for manufacturing and industrial development is somewhat in excess of the estimate by the district officer, they placing the acreage at 1,105. It was stated that the improvement was not desired on account of the mineral resources of the locality, it being recognized that these would not be greatly affected, but on account of the possible commercial and industrial development, it being expected that slack water would induce the establishment of factories and other industries on the banks of the river on sites available for such purposes. The extent of such development and the tonnage to be so created is of course problematic.

It is the opinion of the Board that if the stream were improved as proposed manufacturing establishments would probably occupy the available sites thereby made accessible by water, and the benefits resulting from increased industrial activity and the consequent increased value of suitable manufacturing sites might reasonably be credited largely to such improvement. While benefits of this character are of paramount importance to the local community, they are not of such general interest as would justify expenditure of funds by the United States. Some water-borne commerce would no doubt be developed, but in view of the local conditions which make it evident that only a comparatively small amount of the mineral resources of the locality would be shipped by water, and that but meager benefits (not susceptible of determination) in the shape of lower freight rates and decreased prices of commodities can be expected, the Board is of opinion that the relatively large expenditure required to provide slack-water navigation over so short a stretch of river is not justified.

In view of the above statements, it concurs with the district officer and the division engineer in believing that the Youghiogheny River is not at present worthy of improvement by the United States.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 346.

TOMS RIVER, NEW JERSEY.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORTS OF EXAMINATION AND SURVEY OF TOMS RIVER, NEW JERSEY, AT AND NEAR THE VILLAGE OF TOMS RIVER.

DECEMBER 16, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 12, 1907.

SIR: I have the honor to transmit herewith a letter from the Acting Chief of Engineers, U. S. Army, of this date, together with copies of reports from Maj. C. A. F. Flagler, Corps of Engineers, dated May 6 and October 16, 1907, of a preliminary examination and survey, respectively, of Toms River, New Jersey, at and near the village of Toms River, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 12, 1907.

SIR: I have the honor to submit herewith for transmission to Congress reports of May 6, 1907, and October 16, 1907, by Maj. C. A. F. Flagler, Corps of Engineers, on preliminary examination and survey, respectively, authorized by the river and harbor act approved March 2, 1907, of Toms River, New Jersey, with a view to obtaining 5 feet of water on shoals near village of Toms River.

The plan of improvement presented and recommended for adoption provides for securing a depth of 5 feet at mean low water near Toms River village and channel 100 feet wide to the 5-foot depth below, at

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an estimated first cost of $10,050, with $1,000 annually for maintenance after completion.

I concur in the views of the district officer, the division engineer, and the Board of Engineers for Rivers and Harbors that this locality is worthy of improvement by the United States in the manner proposed.

Very respectfully,

SMITH S. LEACH,
Acting Chief of Engineers.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF TOMS RIVER, NEW JERSEY, AT AND NEAR THE VILLAGE OF TOMS RIVER.

ENGINEER OFFICE, UNITED STATES ARMY,
Wilmington, Del., May 6, 1907.

GENERAL: I have the honor to submit the following report on a preliminary examination of Toms River, New Jersey, assigned to me by letter from the Office of the Chief of Engineers, dated March 14, 1907.

Section 3 of the river and harbor act of March 2, 1907, relating to preliminary examinations and surveys at various localities, provides as follows:

Toms River [New Jersey], with a view to obtaining five feet of water on shoals near village of Toms River.

Toms River is a tributary of Barnegat Bay and enters the bay on its western shore about 11 miles above Barnegat Inlet. The source of Toms River is about 34 miles to the northwest of its mouth. The tidal flow in the river is small, but there is a large fresh-water flow from a considerable drainage basin. The town of Toms River is about 5 miles above the mouth and is the most considerable town upon it. Island Heights, a summer resort, is located on the left bank about 1 mile above the mouth. At Island Heights the river is spanned by a drawbridge of the Pennsylvania Railroad with two openings having a clear width of 38 feet. At the town of Toms River an island in the river has been bulkheaded and converted into a public dock available for use for pleasure and commercial craft without charge. One of the principal State roads passes Toms River (town) and crosses this island, which is connected with the banks by two fixed highway bridges. A short distance above this island the river is crossed by a fixed railway bridge of the Central Railroad of New Jersey. The island is the head of navigation on the river.

A preliminary examination was made of Toms River in 1890 and a survey in 1891 as provided for in the river and harbor act of September 19, 1890. Reports thereon were rendered by Maj. C. W. Raymond, Corps of Engineers (pp. 1114–1116, Annual Report of the Chief of Engineers, 1891). Maj. Raymond reported the river as worthy of improvement and submitted a project and estimate for a channel 75 feet wide and 6 feet deep at mean low water about 3,500 feet long, giving access with this depth to the town of Toms River from Barnegat Bay. The estimated cost was $10,000.

On April 15, 1907, I held an informal public hearing at Toms River and afterwards made an examination of the river in a launch. The hearing was largely attended, and from statements submitted there and later the commercial statistics given below were compiled.

The town of Toms River is the county seat of Ocean County and the distributing point for a large section of the county. It has about

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5,000 inhabitants and contains the public buildings, four hotels, several boarding houses, sawmills, boat-building plants, etc. A large part of the trade of the town is with summer residents on the beaches and other nearby resorts. The assessed value of real property is $850,000, said to be about one-half the real value.

Up to 1876 the stream of Toms River was navigable by vessels drawing 6 feet of water up to the Main Street Bridge, in the center of the town. For a century or more vessels of that draft are said to have carried from Toms River pine wood, charcoal, etc., to Philadelphia, New York, and other eastern points and brought back coal, lumber, brick, lime, dry goods, groceries, and miscellaneous merchandise. At times there were as many as 50 such vessels trading in and out of Toms River which successfully competed with the railroads. The deterioration of the channel during the last thirty years, by degrees, has greatly reduced the water traffic. Boats drawing over 2½ feet can not now reach the public dock, and freight must generally be lightered.

Toms River also maintained a large fleet of fishing, clam, and oyster boats, which brought their catches to the town; and summer excursion boats, carrying between 300 and 500 passengers, made trips between Toms River and Seaside Park. This has been discontinued on account of the shoaling of the river, and only one small boat, averaging about 75 passengers, now runs from a pier some distance below the town.

Two railroads carry to and from Toms River annually from 15,000 to 20,000 tons of freight, much of which would be shipped by water if the channel permitted, at largely reduced cost of transportation. The annual shipments to and from Toms River may be stated as follows:

Fruits, poultry, vegetables, etc	$72,000
Fish, oysters, and clams	10,000
Lumber, sawed	200,000
Bricks, clay, and sand	56,000
Coal	40,000
Hardware	75,000
Building material	500,000
Groceries	300,000
Dry goods, clothing, etc	100,000
Cord wood	6,000
Miscellaneous	12,000
Total	1,371,000

A canvass of thirty-five of the business houses in Toms River produced the following statement of their aggregate present business and the expected business to be derived from improvement of the channel, as follows:

Present annual business	$491,383
Increase expected from improvement	96,264
Present water business	36,100
Prospective water business	94,100

Others submit statements as follows:

A. B. Newbury Lumber Company: Largest in Ocean County. Carries full supply of coal, building material, and hardware. Ship $20,000 annually to tide-water points. Railroad rate to Seaside Park, $1.60 per ton, plus 40 cents haulage, equals $2 per ton; by water, if channel is improved, 50 cents per ton. Formerly kept lighters for the work. Annual business, $50,000; railroad freight bills, $8,000 per annum.

E. R. Yoder: 2,000 cords of wood shipped each year—railroad rates to Philadelphia, $1.75; to Hoboken, $2.10; to Brooklyn, $2.15. Would ship 30,000 to

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50,000 tons per year of clay to Perth Amboy and Point Breeze if freight rates permitted. Sand for filtering available in large quantities. Railroad rates to Philadelphia, $0.90; to Bayonne, $1.55. Receives continually requests for shipment by water.

G. W. Rogers: Runs passenger boat to Seaside Park and Island Heights. Average number of passengers during summer months is 75 per day; used to be 20 per cent higher when he could get up to public dock. Will build larger boat when deep water is had.

L. Chamberlain: Does $1,500 per year repair work on small boats; could do $4,000 worth with deep water.

E. R. Robinson, boat builder: Last year, new work, $1,500; repairs, $800. With deep water would be, new work, $3,000; repairs, $2,000.

George C. Van Hise, Riverside House: $16,000 per year; with deep water, $20,000.

Building Loan Association: Assets, $214,000; annual business, $93,000.

A. J. Kelley, Ocean House: Receipts May 1 to October 1, 1906, $16,681.75; with deep water would be doubled.

Toms River is located on one of the principal automobile lines of travel and has a large and constantly increasing business from this source. Suitable depth in the river would increase this traffic, owing to the ease with which owners could communicate with their yachts at this point.

The left bank of the river below the town is occupied by handsome private summer residences generally provided with small private piers. This water front is largely protected by sea walls and extremely well kept. The stream presents the most attractive appearance of any that I have seen in New Jersey.

The information obtained in the survey of 1891 is now practically useless. The deep water shown therein in the upper river has shifted to the opposite bank, and the tidal data are greatly at variance with the present conditions.

The desires of those interested are for a channel to carry a suitable depth and width to the public dock for pleasure craft, small excursion steamers, and small schooners and barges. The depth is limited by the act to 5 feet; the expressed wish as to width is for 100 feet, though 75 feet is deemed sufficient by many of those most interested. The length of channel required to reach 5-foot water in the river is probably not over 3,000 feet. The relief thus asked is slight, and the cost would not be great in view of the interests involved. I therefore respectfully recommend Toms River as worthy of improvement by the United States within the limits outlined above, and request authority to make a survey of the upper river with a view to the preparation of project and estimate for improvement. Estimated cost of survey, $380.

Very respectfully, your obedient servant,

C. A. F. FLAGLER,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U.S. A.
(Through the Division Engineer.)

[First indorsement.]

U. S. ENGINEER OFFICE, EASTERN DIVISION,
New York City, May 9, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army, concurring in recommendation of district officer.

AMOS STICKNEY,
Colonel, Corps of Engineers,
Division Engineer.

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[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., May 13, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

Past and present physical and commercial conditions on Toms River are explained in the within report, as is also the industrial development at the town of Toms River. It appears that in former years the river was navigable by vessels drawing 6 feet of water up to the Main Street Bridge, when considerable traffic existed, but in the last thirty years the channel has deteriorated to such an extent that boats drawing over 2½ feet can not now reach the public dock. The improvement desired, as indicated by the language of the act ordering this examination, is the excavation of a channel 5 feet deep, to afford navigation to the public dock at Toms River. The district officer states that the proposed channel will probably be not more than 3,000 feet in length and that its cost will not be great in view of the interests involved.

From the information contained in the within report it would appear to the Board that the locality sustains a commerce of sufficient importance to warrant further investigation with a view to improvement if the cost is found to be reasonable. For the purpose of affording definite data on this subject, it concurs with the district officer and the division engineer in recommending that an allotment of $380 be made for a survey.

For the Board.

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

[Fourth indorsement.]

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, May 15, 1907.

Respectfully submitted to the Secretary of War.

This is a report on preliminary examination of Toms River, New Jersey, authorized by the river and harbor act of March 2, 1907.

Inviting attention to the report of the Board of Engineers for Rivers and Harbor in the preceding indorsement, I recommend that a survey of the locality, as proposed, be authorized.

FREDERIC V. ABBOT,
Acting Chief of Engineers.

[Fifth indorsement.]

WAR DEPARTMENT,
May 16, 1907.

Approved as recommended by the Chief of Engineers in the preceding indorsement.

ROBERT SHAW OLIVER,
Assistant Secretary of War.

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SURVEY OF TOMS RIVER, NEW JERSEY, AT AND NEAR THE VILLAGE OF TOMS RIVER.

ENGINEER OFFICE, UNITED STATES ARMY,
Wilmington, Del., October 16, 1907.

GENERAL: I have the honor to submit the following report of survey, with project and estimate, for improvement of Toms River, New Jersey, as directed in letter from the Office of the Chief of Engineers dated May 18, 1907.

I inclose herewith detailed report of Mr. George W. T. Miller, assistant engineer, on the survey, together with map[a] thereof. The survey indicates that a suitable channel can be obtained at reasonable cost across the shoals near Toms River village, giving a depth of 5 feet at mean low water from the town of Toms River to the same depth in Barnegat Bay, the channel following generally the northern, or left, bank of Toms River.

The estimated cost of such a channel, 75 feet in width, is $8,650 with an estimated annual cost for maintenance of $900. For a channel 100 feet in width, estimated cost of construction is $10,050 with an estimated annual cost for maintenance of $1,000. In case of first construction these figures are based upon sufficient funds being appropriated for completing the entire work in one season and in one contract, as no dredging plants are available in the vicinity and it is necessary that they should be brought from a distance, which would largely increase the cost if the work should be subdivided. The cost of maintenance is based on clearing out the channel about once in three years, using the combined annual estimate for that period.

The desire of those interested in the navigation of the stream has been expressed very strongly for a channel 100 feet in width, which is the minimum that would permit the use of sailing craft without necessity for towing; and 75 feet is considered the minimum that would be satisfactory for general use of power boats or sailing craft and barges under tow.

The commercial statistics quoted in the report on the preliminary examination of this stream under date of May 6, 1907, together with the large increase in the attractiveness of the river and town as a summer resort, appear to me to justify the expenditure necessary for the construction and maintenance of the 100-foot channel. This channel would possess the additional advantage that, if funds should be unavailable for maintenance for some years, it would retain fairly satisfactory navigable qualities for a much longer time than a 75-foot channel.

Very respectfully, your obedient servant,

C. A. F. FLAGLER,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

U. S. ENGINEER OFFICE, EASTERN DIVISION,
New York, N. Y., October 18, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army, concurring in the views and recommendations of the district officer as

[a] Not printed.

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to providing a channel 100 feet wide, as the increased facilities afforded by such a channel more than offset the difference in original cost and cost of maintenance of such a channel as compared with one 75 feet wide.

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Division Engineer.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., November 4, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

In the within report the district officer submits estimates for channels of 75 and 100 feet in width, and of the specified depth of 5 feet, amounting to $8,650 and $10,050, respectively, with corresponding estimates for maintenance of $900 and $1,000. He believes that the increased facilities afforded by a channel 100 feet wide more than offset the difference in original cost and cost of maintenance of such a channel as compared with one 75 feet wide, and he recommends the adoption of the 100-foot project. In this recommendation the division engineer concurs.

From statistics furnished in the report on preliminary examination it appears that the commercial growth of this stream has been retarded by the lack of a suitable navigable channel. It is stated that two railroads carry to and from Toms River annually from 15,000 to 20,000 tons of freight, much of which, it is expected, would be shipped by water if the channel permitted.

In the opinion of the Board the estimated cost of providing a channel 100 feet in width is reasonable when compared with the probable resulting benefits to navigation, and it recommends, therefore, the adoption of the project proposed by the district officer at an initial cost of $10,050, and $1,000 annually thereafter for maintenance.

For the Board:

R. L. HOXIE,
Colonel, Corps of Engineers,
Senior Member Present.

REPORT OF GEORGE W. T. MILLER, ASSISTANT ENGINEER.

ENGINEER OFFICE, UNITED STATES ARMY,
Wilmington, Del., September 21, 1907.

MAJOR: I have the honor to submit a report upon the survey of Toms River, New Jersey, with map and estimates of the cost of improvement.

The survey started at the highway bridge at the village of Toms River and extended down river to the point where the 5-foot low-water depth becomes continuous, a distance of about 3,200 feet. The shore line of the basin, immediately above the bridge, was also located. The survey showed very little change from natural causes when compared with that made in June, 1891, but in the immediate vicinity of the bridge, there are marked changes due to extension of bulkheads and reclamation of the island over which the bridge passes. This island has been enlarged, bulkheaded, and improved at public expense, and is now the town dock, free to the public on all sides.

From the basin above, the river flows through two sluiceways in the bridge, one 62 feet wide at the extreme southern end and the other, 46 feet wide at the extreme northern end of the bridge. The natural width of the stream from outside to outside of sluiceways is 370 feet, but this contraction does not seem to have had any ill effects upon the stream below. The two forks, 50 to 75 feet wide, made by the

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island, meet about 400 feet from the bridge and the stream suddenly broadens to a wide shallow waterway, with numerous depressions and irregularities in its bed, but no defined channel for the next half mile. The width is about 1,000 feet to Cedar Point, where it contracts to 600 feet, and then after passing this point it expands still more.

The village of Toms River is located on the northern shore and this shore is improved by bulkheads and seawalls to below the limits of the survey, except at the intersection of the two forks where there is a sandy point upon which a boatyard is located. This point has been added to and extended into the river considerably, since the survey of 1891, by the dumping of refuse.

The southern side of the southern fork has been recently bulkheaded by the Central Railroad of New Jersey for its entire length. From the lower end of this bulkhead, excepting the railroad embankment, the entire southern shore is unimproved to Cedar Point, where a large boatyard is located.

The mean tidal range during the period of observation was five-tenths of a foot and the extreme fluctation was 1.5 feet, nine-tenths above the mean and six-tenths below it. The deeper water below the forks is close to the north shore. The riparian commission of New Jersey has established lines along this shore limiting the extension of bulkheads and wharves, and as practically all the business on the river follows this side, the proposed channel is platted on the chart near to and practically parallel to the riparian commission's lines, thereby taking advantage of the deeper water, meeting the business conditions.

At the entrance of Toms River into Barnegat Bay the controlling depth is about 5 feet at low water, and the river and harbor act of March 2, 1907, calling for a preliminary examination, limited the investigation to that depth. I have calculated the amount of dredging required to make a 5-foot depth, 75 feet and 100 feet wide, respectively, from that depth to the forks, and the dredging of the forks to that depth for their full width, as they are bulkheaded on both sides. The length of the northern fork is 400 feet, that of the southern is 500 feet, and from the forks to the 5-foot curve the distance is 2,700 feet.

Dredging the forks, together with a channel 75 feet in width, will require the removal of 30,250 cubic yards, place measure. Dredging the forks, together with a channel 100 feet in width, will require the removal of 36,500 cubic yards, place measure.

For a channel 5 feet in depth and 75 feet in width from the 5-foot depth to the forks and the width of the forks to the bridge:

30,250 cubic yards, at 26 cents	$7,865
Add about 10 per cent for egineering and contingencies	785
Total	8,650

For the same dimensions for the forks and 100 feet in width below:

36,500 cubic yards, at 25 cents	$9,125
Add about 10 per cent for engineering and contingencies	925
Total	10,050

These estimates are based upon the supposition that the whole amount will be appropriated at one time, as a dredging plant would have to be brought a long distance, and the expense of moving it more than once would add very materially to the cost, even if a contractor could be induced to risk the dangers of an ocean tow with a small light-draft dredge for a less amount.

Very respectfully, your obedient servant,

GEORGE W. T. MILLER,
Assistant Engineer.

Maj. C. A. F. FLAGLER,
Corps of Engineers, U. S. A.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 347.

CALOOSAHATCHEE AND ORANGE RIVERS, FLORIDA.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF CALOOSAHATCHEE AND ORANGE RIVERS, FLORIDA.

DECEMBER 16, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 12, 1907.

SIR: I have the honor to transmit herewith a letter from the Acting Chief of Engineers, U. S. Army, dated 10th instant, together with copy of a report from Maj. Francis R. Shunk, Corps of Engineers, dated July 29, 1907, of a preliminary examination of Caloosahatchee River, Florida, from Lake Okechobee to the Gulf, including Orange River, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 10, 1907.

SIR: I have the honor to submit herewith a report dated July 29, 1907, by Maj. Francis R. Shunk, Corps of Engineers, giving the results of a preliminary examination authorized by the river and harbor act approved March 2, 1907, of Caloosahatchee River, Florida, from Lake Okechobee to the Gulf, including Orange River.

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Orange River from the mouth to the head of navigation and Caloosahatchee River up to Fort Thompson, have been under improvement for several years. No work has been done by the United States on the Caloosahatchee above Fort Thompson to Lake Okechobee.

As a result of his investigation Major Shunk reports that no improvement is necessary on Caloosahatchee River above Fort Thompson, and none on the river below Fort Thompson or on Orange River other than that of maintenance under existing projects, except at the mouth of the Caloosahatchee. This channel near the mouth is, in his opinion, not well located, and he recommends a survey with a view of straightening the same. This opinion and recommendation are concurred in by the division engineer, Lieut. Col. Dan. C. Kingman, Corps of Engineers.

This report has been referred, as required by law, for consideration by the Board of Engineers for Rivers and Harbors, and attention is respectfully invited to the Board's report of November 25, 1907, herewith. The Board agrees with the views of the local officer as to the Orange and upper Caloosahatchee rivers; but, for the reasons given, does not concur in recommending a survey with a view to straightening the channel near the mouth of the latter river.

I concur in the views of the Board and recommend that no survey be ordered, and that this report be transmitted to Congress as in the case of other localities regarded as not worthy of further improvement by the United States.

Very respectfully,

SMITH S. LEACH,
Acting Chief of Engineers.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF CALOOSAHATCHEE RIVER, FLORIDA, FROM LAKE OKECHOBEE TO THE GULF, INCLUDING ORANGE RIVER.

UNITED STATES ENGINEER OFFICE,
Jacksonville, Fla., July 29, 1907.

GENERAL: In compliance with Department letter of March 14, 1907, I have the honor to submit the following report upon preliminary examination of Caloosahatchee River, Florida, from Lake Okechobee to the Gulf, including Orange River, authorized by the river and harbor act of March 2, 1907.

Examination was made of Caloosahatchee River in March and April, 1879. Report is contained in Report of the Chief of Engineers for 1879, page 863 et seq.

Survey was made of Caloosahatchee River in March, April, and May, 1887. Report is contained in Report of the Chief of Engineers for 1888, page 1095 et seq.

Examination was made of the continuous waterway, including Kissimmee River, Lake Okechobee, and Caloosahatchee River, in 1899. Report is contained in Report of the Chief of Engineers for 1902, page 1225 et seq.

Examination was made of Caloosahatchee River in June, 1905. Report is contained in House Document No. 180, Fifty-ninth Congress, first session.

Examination was made of Orange River in December, 1896. Report is contained in Report of the Chief of Engineers for 1897, page 1570 et seq.

Examination was made of Orange River in October, 1899. Report is contained in Report of the Chief of Engineers for 1900, page 2032 et seq.

Survey was made of Orange River in November and December, 1899. Report is contained in Report of the Chief of Engineers for 1900, page 2035 et seq.

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The examination authorized by the act of March 2, 1907, was made April 22–25, 1907, by Mr. W. W. Fineren, junior engineer, whose report is substantially as follows:

The headwaters of Caloosahatchee River were originally the saw-grass region and small lakes westward of Lake Okechobee, but canals dredged from there to Lake Okechobee by the Atlantic and Gulf Coast Canal and Okechobee Land Company have made Lake Okechobee the source of the river. Lake Okechobee is fed by the Kissimmee River, Taylors Creek, and Fisheating Creek. Caloosahatchee River flows in a generally west-southwesterly direction, and empties about 5 miles from the Gulf of Mexico into San Carlos Bay. Its only tributary is Orange River, flowing into it from the southward. The mouth of Orange River is 22 miles from the mouth of Caloosahatchee River. The three sources of water supply to the Caloosahatchee River are rainfall, Lake Okechobee, and Orange River.

The lands bordering these rivers are very fertile, and a great quantity of citrus fruit is grown, together with corn, pease, and other produce. Cattle raising on the upper river, where there is extensive pasturage, is an important industry.

There are nine post-offices on the Caloosahatchee River. Beginning at the mouth, they are as follows: New Prospect, Fort Myers, Orga, Rialto, Caloosa, Alva, Denaud, Turners, and Labelle. From the mouth of the river to the Gulf are Puntarasa and Sanibel, situated on San Carlos Bay.

The principal settlement is Fort Myers. It is the county seat of Lee County and is a very thriving town, transacting a large mercantile business with the inhabitants of the surrounding country. There is a daily mail on the upper river, a steamer leaving daily at each end of the route, namely, Fort Myers and Labelle. There is also a triweekly service between Fort Myers and Buckingham, up Orange River. There is also a daily mail carried by launches between Fort Myers and the towns along San Carlos Bay and Estero Bay. Fort Myers is the terminus of a branch of the Atlantic Coast Line Railroad from Lakeland to Fort Myers.

The channel of the Caloosahatchee River has been improved and maintained by appropriations made at various times from 1882 until the present time. The first work was done in 1883, and the project, with its modifications, was completed in 1901. The project adopted in 1882, and modified in 1886 and 1888, provided for a channel 7 feet deep at mean low water and 100 feet wide from the mouth of the river to Fort Myers; for a channel 4 feet deep at mean low water across the shoal at Beautiful Island, and for snagging and trimming overhanging trees on the upper river. This project is completed and the contemplated results obtained. The project adopted June 13, 1902, for Orange River provided for a channel 4 feet deep at mean low water and 50 feet wide from mouth of the river to the head of navigation. The project was completed in 1903.

For convenience of discussion, I will divide my report into three parts, as follows:

1. The river from its source to the head of navigation at Fort Thompson.—From Lake Okechobee to Fort Thompson the land bordering the river is very low and generally swampy. There are some very good pasture lands which are flooded during high stage of water. There are no settlements of any consequence along those banks, the only need of navigation being to accommodate the fishing boats that run to the lake from points below Fort Thompson. The distance from Lake Okechobee to Fort Thompson is 26 miles, with a fall of 14.15 feet. At the time of my examination the water was very low. In the Okechobee Canal and in Lake Hikpochee there was about 2 feet depth of water; between Lake Hikpochee and Lake Bonnet, about 3 feet. Bonnet Lake at low water is merely an extensive swamp, with a winding channel difficult to navigate. I found only 12 inches of water in the shallowest places in this channel. From Lake Bonnet to Lake Flirt there is only 18 inches of water in the shallowest spots, and from Lake Flirt to Fort Thompson the depth was approximately 2 feet.

With very little dredging in Lake Bonnet and Lake Flirt the channel could be deepened sufficiently for the needs of the fish boats, but I do not believe the necessity warrants the expense.

In talking with interested parties living at various places between Fort Myers and Lake Okechobee, I found a great difference of opinion as to what is desired. There being a heavy fall from the lake to Fort Thompson, and not so great a fall from there to the Gulf, the country around Fort Thompson and below it is subjected to severe floods in rainy weather. About three years ago a dam was built by private interests across the drainage canal between Lake Hikpochee and Bonnet Lake, and was blown up a few months afterwards by unknown parties, and at present it seems certain that another dam with a lock is to be built at the same site by the State of Florida for the purpose of holding flood water. With the people interested, the whole problem is one

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of drainage, which I do not believe is a proper discussion for this report. I would therefore recommend that no survey be made of the river above Fort Thompson.

2. The river from Fort Thompson to Fort Myers, including Orange River.—There is an existing channel of 4 feet at mean low water from Fort Myers up to within a mile of Labelle, where there are some sand shoals with a depth of 2½ feet. The channel near Labelle is badly obstructed with fallen trees or logs and large bowlders, which have rolled into the river and which have become very dangerous. Above Labelle there is only 2 feet of water, and navigation has been consequently abandoned in that part of the river. There is an existing channel of 4 feet at low water from the mouth of Orange River to the head of navigation at Buckingham. At the present time it is nearly impossible to get within three-fourths of a mile of Buckingham, owing to the immense quantity of water hyacinths that have become compact in the river, the tide carrying the hyacinth up the river and the current of the river not being sufficiently strong to clear the channel of the obstruction. Owing to this condition one trip a week has been discontinued on the schedule of the freight steamer plying between Fort Myers and Buckingham. The project of 4 feet at low water is sufficient for all apparent needs of commerce, and otherwise than snagging and clearing the channel to 4 feet depth near Labelle, and clearing the channel near Buckingham of water hyacinth, both of which are badly needed, I would recommend that no survey of this part of the river be made with the object of further deepening the channel.

3. The river from Fort Myers to the Gulf.—The project calls for a 7-foot channel from Fort Myers to the mouth of the river. There is now scarcely 5 feet at some points where the channel crosses the tidal currents. This channel is very crooked, running in and out of oyster reefs, and is very hard to navigate, especially so in rough weather. In San Carlos Bay, at the mouth of the river, there is very good water, excepting a sand bar at the pass, on which there is only 7 feet. I discussed the matter with members of the Board of Trade, steamboat men, and many others interested in the improvement. Every one was of the same opinion, and very emphatic in the declaration that the lack of water was a serious hindrance to the development of the country in that vicinity. The commerce has fallen off because of the fact that boats capable of sailing the Gulf can not come over the bar to Punta-rasa, and up to Fort Myers, and it is difficult to charter a boat for this reason. The railroad rates are high, and the railroad has been unable to supply cars enough to handle the produce of the surrounding country. With a large crop of citrus fruits and produce, such as the country yields, a channel 12 feet in depth at mean low water from the Gulf of Mexico to Fort Myers would allow the shipment of fruits, etc., to Key West, and thence by steamers to northern markets, and while giving better facilities for the transportation of produce would cause a material reduction in freight rates. During the past season 250,000 crates of citrus fruits alone were sent to northern points. The groves being young are expected to produce 1,000,000 crates in the next two years, and 2,000,000 crates in the next five years. Unless a good channel is secured, the fruit industry of this section will be seriously retarded. A channel properly situated will maintain itself and shorten by at least a mile the distance from Fort Myers to the Gulf. Owing to the apparent need of deeper water and the bright outlook for increased commerce in the near future, I recommend that a survey be made with the object of ascertaining the cost of a 12-foot channel from Fort Myers to the Gulf. It is estimated that the survey will cost about $2,000.

There is no commerce to speak of on the Caloosahatchee River above Fort Thompson, and no improvement is necessary.

From Fort Thompson to the mouth the river has been improved by the United States. Under the project a channel 7 feet deep at mean low water has been provided from the mouth to Fort Myers and a channel 4 feet deep at mean low water from Fort Myers to Fort Thompson. This project was completed in 1901 at a cost of $33,600. Work of maintenance, especially in the upper river, is periodically necessary. The population and commerce of the Caloosahatchee country are increasing, but most of the merchandise imported and produce exported is carried over the Atlantic Coast Line Railroad, which was extended to Fort Myers in 1903. A line of steamers which formerly ran between Fort Myers and Punta Gorda and was well patronized

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has been taken off since the completion of the railroad. Commercial statistics since 1896 are as follows:

	Tons.		Tons.
1896	67,051	1903	27,576
1897	69,792	1904	12,255
1899	33,101	1905	9,577
1900	22,737	1906	22,265
1902	27,895		

The falling off in 1905 was due probably to the opening of the railroad and the recovery in 1906 to the unusual congestion of railroad traffic. I do not think that any great increase in commerce is to be looked for, except in fruits and vegetables. Time of transportation is such an important consideration with such articles that I think they will always be sent by railroad.

It is my opinion that the 4-foot channel to Fort Thompson and the 4-foot channel in Orange River are sufficient for present needs. With respect to the lower river, I can see no reason for recommending a greater depth than 7 feet. This is ample for all purposes of inland navigation, and there is nothing to justify a deep-water channel to Fort Myers. I believe, however, that this channel near the mouth is not very well located, so that navigation is unduly difficult. Since the United States undertook to provide a navigable channel, I think that this section should be straightened, if it can be done at a reasonable cost. I therefore recommend that a survey be made at an estimated cost of $1,000. Beyond the proposed straightening I am of opinion that the Caloosahatchee River is not worthy of further improvement by the United States.

Very respectfully, your obedient servant,

FRANCIS R. SHUNK,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

OFFICE OF DIVISION ENGINEER, SOUTHEAST DIVISION,
Savannah, Ga., August 2, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army.

I concur with the district officer in the opinion that a depth of 7 feet is ample for river navigation for the class of rivers to which this one belongs. I am also of the opinion that, in general, it is not advisable or necessary to attempt to create two seaports on the same river only a few miles apart.

I think, however, it might be advisable to attempt to provide a better navigable channel, and recommend the allotment of $1,000 for the survey recommended by the district engineer.

DAN C. KINGMAN,
Lieut. Col., Corps of Engineers,
Division Engineer, Southeast Division.

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[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., November 25, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

Reference is made within to several reports which have heretofore been made on the subject of the improvement of the Caloosahatchee and Orange rivers, from which, in connection with the within report, a good understanding of the physical and commercial conditions may be obtained. Under the original and modified projects a channel 100 feet wide and 7 feet deep has been provided from the mouth of the Caloosahatchee River to Fort Myers, and a channel 4 feet deep from Fort Myers to Fort Thompson, the recognized head of navigation; while on the Orange River a channel 4 feet deep has also been obtained from its mouth to the head of navigation. It appears from the report of the junior engineer, quoted within, that these channels have in places deteriorated to some extent. Their restoration to project dimensions is properly a work of maintenance.

Between Lake Okechobee and Fort Thompson the waterway is very shallow and is in part artificial, its principal object being drainage. There is practically no commerce on this part of the waterway, and there seems to be no reasonable demand for its improvement. With reference to the river below, the district officer gives as his opinion that the 4-foot channel to Fort Thompson and the 4-foot channel in Orange River are sufficient for present needs, and that he can see no reason for recommending a greater depth than 7 feet in the stretch of river from its mouth to Fort Myers; but he believes that this channel should be straightened near the mouth of the river, where it is crooked and navigation somewhat difficult, and he recommends that a survey be made at a cost of $1,000, in which recommendation the division engineer concurs.

In a report on preliminary examination of this river, submitted in in accordance with the act of March 3, 1905, a similar recommendation was made by the district officer, but the Board of Engineers for Rivers and Harbors, when reviewing said report and after careful investigation of the merits of the case, expressed the opinion—

> that the channel already provided by the United States is sufficient for the handling of the small commerce likely to use it and also to create and maintain an effective competition between water and rail transportation. The Board believes, however, that the channel of the present project should be maintained by periodical snagging and dredging. Beyond this the Board believes that the Caloosahatchee River is not worthy of improvement by the United States.

From the description of the locality and its commercial and navigation interests contained within, the conditions appear to be very similar to those which existed at the time of the former report just referred to, there being no apparent change which would justify the Board in reversing its former conclusions. However, with a view to securing all possible information on this subject before submitting its conclusions, the Board requested that interested parties be invited to submit statements and arguments bearing upon the necessity and advisability of the proposed improvement. In response to this invitation several communications were received which referred to the commercial conditions and the desirability of additional depth of water. One communication stated that the most imperative need at the present time is

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the marking of the channel by beacons, a duty with which this Department is not concerned. The Board of Trade of Fort Myers, through its president and secretary, submitted a statement of the commerce on the river and the advantages that would result from deeper water, but did not refer to the necessity of straightening the channel, as recommended by the district officer. The Board made a special effort to secure additional information on this subject by addressing a letter to the Fort Myers Board of Trade, asking "an expression of opinion from navigation interests as to the advisability and necessity, if any exists, for straightening the present channel near the mouth of the river if the depth of 7 feet now called for by the existing project is not changed," but no reply has been received, though the Board's letter was dated six weeks ago.

The water-borne commerce of this section of country is not large, and although the production of the surrounding country is undoubtedly increasing, this is not indicated by the amount of commerce carried on the river, due no doubt to railroad facilities which were made available a few years ago and through which means no doubt the greater part of the fruits and vegetables, which form the most valuable items of production, are shipped. It appears evident that the depth of 4 feet in the upper Caloosahatchee and in the Orange rivers is ample for the present and reasonably prospective commerce, and the Board agrees with the district officer that it is not advisable at the present time to undertake a more extensive improvement.

With reference to the lower Caloosahatchee River, very fair facilities have already been provided. These afford a channel suitable for the navigation of light-draft steamers and barges of the class usually used on interior waterways. To create a channel 12 or 15 feet in depth, as suggested by interested parties, with a view to accommodating seagoing vessels, would be very expensive and not justified by the interests involved. The Board therefore agrees with the district officer in believing that the depth of 7 feet provided for by the existing project to Fort Myers is sufficient, and in view of the lack of interest shown in the question of straightening the channel near the mouth of the river it is inclined to believe that no great necessity for such improvement exists, and therefore it can not concur in recommending a survey for the purpose of estimating its cost.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 348.

DUCK RIVER, TENNESSEE.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF DUCK RIVER, TENNESSEE, FROM ITS MOUTH TO CENTERVILLE.

DECEMBER 16, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 13, 1907.

SIR: I have the honor to transmit herewith a letter from the Acting Chief of Engineers, U. S. Army, dated 12th instant, together with copy of a report from Maj. Wm. W. Harts, Corps of Engineers, dated August 20, 1907, of a preliminary examination of Duck River, Tennessee, from its mouth to Centerville, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 12, 1907.

SIR: I have the honor to submit herewith for transmission to Congress report of August 20, 1907, by Maj. Wm. W. Harts, Corps of Engineers, on preliminary examination of Duck River, Tennessee, from its mouth to Centerville, authorized by the river and harbor act approved March 2, 1907.

In 1881–1883 Federal appropriations amounting to $13,000 were expended on this stream in removing channel obstructions, deepening bars, and building dikes. These improvements are now practically obliterated.

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I concur in the opinion of the district officer, the division engineer, and the Board of Engineers for Rivers and Harbors that Duck River is not worthy of further improvement by the United States at the present time.

Very respectfully,

SMITH S. LEACH,
Acting Chief of Engineers.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF DUCK RIVER, TENNESSEE, FROM ITS MOUTH TO CENTERVILLE.

ENGINEER OFFICE, UNITED STATES ARMY,
Chattanooga, Tenn., August 20, 1907.

GENERAL: In accordance with the instructions of your letter of March 14, 1907, I have the honor to submit the following report of a preliminary examination of Duck River, Tennessee, required by act of Congress of March 2, 1907.

This river was inspected at several places by me in July, 1907.

Location and description.—Duck River is a small stream commencing in the central part of Tennessee, near Manchester in Coffee County. It flows in a generally westerly direction until it empties into the Tennessee River, near Waverly. Its length is approximately 250 miles. Its low-water discharge is not to exceed 1,000 cubic feet per second. It consists of a succession of fairly deep pools having an average width of about 100 yards, separated every few miles by rock and gravel shoals where the usual width is not over 100 feet and the depth but a few inches. At high water its surface is from 25 to 30 feet above the low-water level in the lower reaches, and as high as 45 feet above low water in the upper reaches.

In its upper portions it is steep and rocky; in the lower portions the slopes are flatter and rock is also found. Throughout its entire length it is more or less obstructed by overhanging trees, snags, and rock and gravel bars. It is said to have been formerly navigated by steamboats as far as Centerville at suitable stages. The portion above Centerville is very seldom used, except occasionally for downstream lumber traffic at high-water stages. From elevations furnished by railroad companies and from river distances obtained from former surveys and other various sources the low-water level at Manchester, about 230 miles from the mouth, has been ascertained to be at an elevation of about 990 feet above sea level; at Columbia, 125 miles from the mouth, it is 522 feet; at Centerville, 68½ miles above the mouth, 451 feet, and at the mouth the low-water surface in the Tennessee River is about 318 feet above low-tide level. We thus see that its fall from Manchester to Columbia is 468 feet, or about 4.4 feet per mile; from Columbia to Centerville it is 91 feet, or 1.5 feet per mile, and from Centerville to the mouth it is 122 feet, or 1.8 feet per mile.

Former improvements.—From 1840 to 1846 acts were passed by the legislature of the State of Tennessee incorporating the "Duck River Steam Navigation Company," and other similar companies, to make Duck River navigable for steamboats from Columbia to the Tennessee River by means of locks and dams. One or more locks were said to have been completed under these acts, but the company was later enjoined by the courts from prosecuting its work, and these improvements were thenceforward neglected.

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Federal appropriations amounting to $13,000 were made in 1880, 1881, and 1882, and expended in 1881, 1882, and 1883 in removing obstructions, deepening bars, and building dikes; and the channel was left in a fairly satisfactory condition, although all the work contemplated was not finished, owing to lack of money. No further funds were ever appropriated, and the improvements thus commenced were abandoned. They are now practically obliterated.

Previous reports.—Duck River was first examined on behalf of the Federal Government in 1879 by Maj. W. R. King, Corps of Engineers, from Centerville to its mouth (Annual Report of the Chief of Engineers for 1880, p. 1682). As a result of this examination it was recommended that the overhanging trees and obstructing snags be removed and that bars be excavated and wing dams built to provide a navigable depth of 3 feet for perhaps six months of the year. The cost was estimated at $35,000, and on this project were based the appropriations made in 1880–1882.

In 1892 a further examination was made under the direction of Lieut. Col. H. M. Robert, Corps of Engineers, by Lieut. John Biddle, Corps of Engineers (Annual Report of the Chief of Engineers for 1893, p. 2406), who recommended no improvement beyond the removal of snags and overhanging trees in the first 20 miles above the mouth.

Counties affected.—Duck River flows successively through Bedford, Marshall, Maury, Hickman, and Humphreys counties.

The population in 1900 and the areas of the counties adjacent to the river are shown in the following table:

County.	Population, 1900.	Area, square miles.	Population per square mile.
Coffee	15,574	442	35.0
Bedford	39,468	489	80.7
Marshall	18,763	315	59.5
Maury	42,703	632	67.5
Hickman	16,367	655	25.0
Humphreys	13,398	435	30.8
Total	146,273	2,968	49.2

The total assessed valuations of all property in these counties, as given by the census report of 1902, are as follows:

Coffee	$2,226,731
Bedford	5,336,632
Marshall	3,174,075
Maury	11,364,406
Hickman	2,456,000
Humphreys	2,451,923
Total	27,009,767

At Centerville (population in 1900, 719) there are several flouring mills and factories, and in the length of the river from this town to the mouth there are several sawmills of a temporary character. The farming land along the banks is rich and productive, but it seems probable that few of the products would use the river if improved. The country is sparsely inhabited.

Commercial statistics.—There is but little commerce carried on the river, except at the lower end, where some trade is done in timber products at favorable stages by a single company, which has purchased

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much of the timber land along the lower river. The recent high prices for oak and pine have rendered profitable the cutting of wooded areas which formerly were too far from transportation to be put on the market economically. For this reason large quantities of ties and barrel staves are brought out whenever the stage of water is sufficient to furnish transportation. There is now nothing else in the way of traffic.

The only commerce carried in 1906, as far as could be learned, consisted of:

Item.	Tons.	Estimated value.
Lumber	6,000	$75,000
Railroad ties	15,000	50,000
Total	21,000	125,000

There are important phosphate rock quarries adjacent to the river, all the products of which now are handled by rail. Some of this and some of the commerce of Centerville would undoubtedly use an improved river, but the amount would certainly be small for many years.

Possible improvements.—The earliest proposed method of improving this river, commenced in the early forties, was by a system of wooden locks and dams, furnishing slack-water navigation up to Columbia. Improvement by open-river regulation in the lower portion was tried in 1881–1883, and was of slight local and temporary benefit. The only improvement that would be of any immediate benefit would be the removal of overhanging trees and snags, the blasting of rock reefs, and the dredging of gravel bars to diminish the risks of navigation, and the erection of wing dams to increase the depths on the shoals. The only adequate improvement would be by a system of locks and dams.

No navigation of any importance is now attempted above Centerville; but a new steamboat, the *Mary Anderson*, was recently built to bring down staves and ties in the lower reaches. There is no other navigation at present.

No advantage was taken of the improved condition created by the expenditure of the first appropriation, and it is probable that a similar result would follow any further attempts at improvement in the present sparsely settled and undeveloped condition of the country along the banks of the river. The cost of any suitable improvement would be very high compared with the commerce involved.

Recommendations.—The interest of the people of the vicinity in the improvement of the river is apparently restricted to the few persons engaged in the lumber business, and, in less degree, to those scattered persons living along the lower river who might be benefited. The small increase in the use of this stream when in fair navigable condition in 1883–84, and the failure of the improvement then to develop any commerce of importance or permanence, indicate that no better results could be expected to follow any similar expenditure at this time. The expense of a slack-water system of improvement by locks and dams would be far beyond what is now warrantable in view of the present and prospective commerce; and even the cost of open-river regulation would, in my opinion, far exceed the value of the

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resulting general benefits to the commerce of the State. The removal of snags and overhanging trees would perhaps benefit a few persons for a short time each year, but this work would have to be repeated annually to be of value, and if the commerce involved were compelled to pay for the improvement it seems safe to say that a tonnage tax of sufficient size to maintain even the simplest form of effective improvement would be practically prohibitive.

For these reasons I give it as my opinion that the present and prospective commerce on Duck River will not warrant the expenditure of money for its improvement at the present time.

Very respectfully,

WM. W. HARTS,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[Third indorsement.]

OFFICE DIVISION ENGINEER, GULF DIVISION,
New Orleans, La., September 7, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army, concurring in the within recommendations.

E. H. RUFFNER,
Colonel, Corps of Engineers,
Division Engineer.

[Fifth indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., September 30, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

Duck River from its mouth to Centerville was under improvement by the United States between 1881 and 1883, when $13,000 was expended under a project providing for the removal of snags and overhanging trees, the excavation of channel ways through rock and gravel bars, and the construction of brush and riprap dams, so as to afford 2½ to 3½ feet of water in the channel during the boating season of about four to six months each year. This improvement, estimated to cost $35,000, was not completed.

The district officer now states that the work done in 1881–1883 was of slight local and temporary benefit, but the small increase in the use of the stream when in fair navigable condition at that time, and the failure of the improvement then to develop any commerce of importance or permanence, indicate that no better results could be expected to follow any similar expenditure at this time. So far as could be learned, the only commerce now carried on the stream consists of timber products taken out from the lower reaches by one steamboat.

The character of the stream is such that an adequate improvement could only be effected by a system of locks and dams, the cost of which would be out of proportion to the total benefits that would accrue to present and prospective commerce in this sparsely inhabited country. An improvement similar to that formerly undertaken by the United States would be of benefit to the lumber interests, and might result in creating a small commerce in other products; but it is believed that the amount of this commerce would be insufficient to justify the con-

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stantly recurring expenditures necessary to maintain the stream in useful condition. Under existing conditions, timber products can be brought out at favorable stages, and the improvement does not appear to be warranted by the present and reasonably prospective tonnage and value of this product.

No interest having been manifested by persons invited to submit statements and arguments to the Board in behalf of the improvement, the Board concludes that there is no pressing commercial demand for the work, and, in view of the facts stated above, it concurs with the district officer and the division engineer in the opinion that it is not advisable for the United States to undertake the improvement of Duck River at the present time.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 349.

CALUMET RIVER, ILLINOIS.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION, WITH PLAN AND ESTIMATE OF COST OF IMPROVEMENT, OF CALUMET RIVER, ILLINOIS.

DECEMBER 16, 1907.—Referred to the Committee on Rivers and Harbor and ordered to be printed.

WAR DEPARTMENT,
Washington, December 12, 1907.

SIR: I have the honor to transmit herewith a letter from the Acting Chief of Engineers, U. S. Army, dated 10th instant, together with copies of reports from Lieut. Col. W. H. Bixby, Corps of Engineers, dated November 11 and November 25, 1907, of a preliminary examination of Calumet River, Illinois, from One hundred and twenty-second street to its forks, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 10, 1907.

SIR: I have the honor to submit herewith for transmission to Congress reports of November 11 and November 25, 1907, by Lieut. Col. W. H. Bixby, Corps of Engineers, on preliminary examination with plan and estimate of cost of improvement, authorized by the river and

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harbor act, approved March 2, 1907, of Calumet River, Ill., with a view to obtaining a depth of 20 feet from One hundred and twenty-second street to its forks.

This section of the Calumet River is at present being improved under a project which aims to secure a navigable depth of 16 feet. This project may be completed in 1908.

To dredge Calumet River from One hundred and twenty-second street to the forks, a distance of 1.2 miles, 4 feet deeper, to obtain the greater project depth of 20 feet over its full width of 200 feet of river, and for a 750-foot water-surface diameter in the turning basin at the forks, is estimated to cost $78,000.

I concur in the views of the district officer and of the Board of Engineers for Rivers and Harbors that this locality is worthy of improvement by the General Government in the manner proposed.

Very respectfully,

SMITH S. LEACH,
Acting Chief of Engineers.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF CALUMET RIVER, ILLINOIS, FROM ONE HUNDRED AND TWENTY-SECOND STREET, CHICAGO, TO ITS FORKS.

UNITED STATES ENGINEER OFFICE,
Chicago, Ill., November 11, 1907.

GENERAL: Referring to the letter from your office dated March 14, 1907, assigning to this office the duty of making a preliminary examination of Calumet River, Illinois, I have now to submit report upon the same, as follows:

Section 3 of the river and harbor act approved March 2, 1907, provided for this examination by a phraseology as follows:

Illinois: Calumet River, with a view to obtaining a depth of twenty feet from One hundred and twenty-second street to its forks.

Calumet River constitutes the inner portion of Calumet Harbor, a harbor and a shipyard for the largest vessels navigating the Great Lakes. Under past appropriations and contracts now in progress, it has been straightened and deepened and widened, until it now has practically a clear depth of 20 feet over a clear bottom width of at least 180 feet from Lake Michigan up to One hundred and twenty-second street. All that is now necessary to secure such dimensions fully is a little cleaning-up work now in progress under existing contracts to be finished before December 31, 1907. Moreover, from One hundred and twenty-second street to the forks, under past appropriation acts and contract work to be started in 1908, and perhaps completed in 1908, the river heretofore unimproved and already at least 5 feet deep in mid-channel is to be dredged to 17 feet depth (for 16-foot-draft boats), and to at least 180 feet bottom width (200 feet top width), and to be provided with two turning basins, each of 650 feet least diameter and of same depth as the adjoining river. From present appearances, this work will require all funds now available and be appropriated by the next sundry civil act, and will be fully completed by the same.

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What is now asked for is, therefore, an examination as to the advisability of deepening this river for about 1.2 miles in length from One hundred and twenty-second street to the forks and in the turning basin at the forks, so as to increase its 16-foot draft (which it will have at the end of 1908) up to a 20-foot draft; all such work to be done under new appropriations, yet to be voted. In this connection, it seems well to explain that, in accordance with past projects in this part of the Great Lakes, as concurred in by the Board of Engineers for Rivers and Harbors and the Chief of Engineers (see p. 2107, Annual Report, Chief of Engineers, 1902, and p. 2943, Annual Report, Chief of Engineers, 1904), the words "depth of 20 feet" have been interpreted to mean a depth which can be navigated by vessels drawing 20 feet. Such depth is obtained at this place by actual dredging to a clear depth of 21 feet below Chicago datum. The fluctuations of level of Lake Michigan are considerable and rapid, and occasionally there may be, even with this depth, brief periods when the actual depth will not be quite as much as 20 feet. Moreover, in order to guarantee this depth for the first year or two against silting up and shoaling by bank wash and up-river freshets, an extra six inches of average depth should be secured at the time of original dredging. A practical available 20-foot depth requires, therefore, an actual original depth of dredging of 21.5 feet below Chicago datum; and all examinations and surveys are being made upon such basis.

The accompanying map[a] shows the local conditions, the portion under consideration being indicated by a solid black filling between bank lines, and the "forks" being the local designation for the place where Lake Calumet empties into the main river, about 1.2 miles above One hundred and twenty-second street and also about 1.6 miles below the junction of the Little Calumet and Grand Calumet rivers.

The river between One hundred and twenty-second street and the forks is at present crossed by five bridges, of which three are permanent and two are temporary. The three permanent bridges—all railroad bridges—are provided with draws which allow the passage of boats of 60 feet beam. One of the temporary bridges (a drawbridge at Chittenden street) is to be removed by the city early next year, and the other (a ponton bridge at Torrence avenue), having at present a draw of only 52 feet clear width, is to be replaced by the city with a permanent bridge of full-width draw when navigation so demands.

The last time Congress called for a report upon the desirability of improving Calumet River was in 1902, and then the views of the War Department were requested only for a depth of 16 feet over the part of river now under report. The report thereby called for (published as H. Doc. No. 172, 58th Cong., 2d sess.; reprinted at pp. 2941–2949, Annual Report, Chief of Engineers, 1904) led to the 16-foot improvement now in progress; and its recommendations implied an increase of this depth as soon as commerce developed sufficiently.

The commerce of Calumet Harbor and River has been increasing steadily since it has been made available for large deep-draft boats. There are at present over 40 large industries established along Calumet River, covering the manufacture, sale, or storage of steel,

[a] Not printed.

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wrought iron, coal, gypsum, salt, lumber, oils, grains, ice, electricity, etc., and their subproducts, the blast furnaces, rolling mills, and shipyards being specially prominent, large, and busy. The land on both sides of the river is rapidly being occupied by other similiar industrial plants almost as fast as the 20-foot draft is secured. The local community is contributing to the river improvement by donating to the Federal Government, free of cost, all the land needed for such improvement, the full 200-foot width of channelway from the lake to the forks having already been so deeded and the land for turning basins now being gradually arranged for. The water-freight tonnage of this river (actual receipts and shipments), which was only 903,379 tons in 1893, was 3,229,874 tons in 1899 and 5,290,326 tons in 1906, the material carried in 1906 being valued at about $30.000,000. The similar tonnage for 1907 should show further increase. More river harborage is now apparently necessary to keep pace with the demands of the growing industries and commerce.

In my opinion the Calumet River is worthy of improvement by the General Government over the full length from One hundred and twenty-second street up to the forks and to the full depth of 20 feet named in the act of March 2, 1907.

Very respectfully,

W. H. BIXBY,
Lieut. Col., Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.

[Second indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., November 18, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

The present project for the improvement of the Calumet River adopted by the act of March 3, 1905, provides for a channel 200 feet wide and 20 feet deep from the mouth of the river to One hundred and twenty-second street, and of the same width and 16 feet in depth from One hundred and twenty-second street to the forks, with five turning basins, at a total estimated cost of $662,480.50, and $10,000 per annum for maintenance. The depth of 20 feet referred to is understood to be 21 feet below Chicago datum, as explained by the district officer. It appears that the project has been practically completed to One hundred and twenty-second street, a little cleaning-up work only being still required, which is in progress and expected to be completed before December 31, 1907. Under appropriations already made and contracts to be started in 1908, it is expected to complete the project depth of 16 feet and 180 feet bottom width (200 feet top width) between One hundred and twenty-second street and the forks during the year 1908. The present investigation therefore has in view an increase of depth over this section from 16 feet, which it will have by the end of 1908, to 20 feet. The district officer is of opinion that this stream is worthy of the further improvement contemplated.

The commercial growth of this locality has been remarkable, and its full development has probably not yet been reached. The district officer invites attention to the fact of the commerce having grown from 903,379 tons in 1893 to 5,290,326 tons in 1906. Experience has

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shown that as greater depths were extended up the river commercial industry has kept apace, and it is expected that with an increased depth on the stretch now under consideration there will be a further development which will require deep-draft vessels similar to those now used on the lower section of the river, and in the opinion of the Board the increased facilities now asked for should be provided if the cost is not unreasonable.

The district officer makes no recommendation in regard to a survey or estimate of cost. The latter at least is essential in the opinion of the Board. It recommends, therefore, that an estimate be made, and further that a survey be authorized if necessary in order to secure data for the estimate of cost.

For the Board:

R. L. HOXIE,
Colonel, Corps of Engineers,
Senior Member Present.

[Third indorsement.]

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, November 21, 1907.

Respectfully submitted to the Secretary of War.

This is a report on preliminary examination of Calumet River, Illinois, authorized by the river and harbor act of March 2, 1907.

Inviting attention to the report of the Board of Engineers for Rivers and Harbors, in preceding indorsement, I recommend that preparation of plan and estimate of cost of improvement of the locality, as proposed, be authorized.

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

[Fourth indorsement.]

WAR DEPARTMENT,
November 22, 1907.

Approved as recommended by the Chief of Engineers.

ROBERT SHAW OLIVER,
Acting Secretary of War.

PLAN AND ESTIMATE OF COST OF IMPROVEMENT OF CALUMET RIVER, ILLINOIS, FROM ONE HUNDRED AND TWENTY-SECOND STREET, CHICAGO, TO ITS FORKS.

UNITED STATES ENGINEER OFFICE,
Chicago, Ill., November 25, 1907.

GENERAL: In accordance with instructions from your office, I have herewith to submit a report as to the estimated cost of improvement of Calumet River, Illinois, by deepening the river over about 1.2-mile length from One hundred and twenty-second street up to the "forks," and in the turning basin at the forks from its already approved depth of 16 feet up to a new depth of 20 feet, being an increase of 4 feet in depth everywhere for its full width of 200 feet of river, and for a 750-foot water-surface diameter in the turning basin.

Borings have been made this season at about 200 feet intervals and to 21-foot depth along both banks of the river over the length in

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question. No rock, hardpan, nor any other nondredgeable material was encountered, the only materials found being sewage deposits, silt, muck, sand, and clay. The work will therefore be simple dredging; but as the excavated material will have to be either put over the bank wherever riparian owners are willing or dumped in Lake Michigan after several miles of towage, the cost per yard will probably be higher than under recent contracts.

Moreover, for the reasons explained in my recent report on the examination of this stream, actual original dredging must be carried to an average of 21.5-foot depth everywhere in this river in order to assure a 20-foot safe depth for vessels through the first year.

Estimates for securing the desired extra 4 feet of depth by dredging, made in accordance with the above conditions, give results as follows:

	Cubic yards.		
From One hundred and twenty-second street to One hundred and twenty-fourth street	88,500		
From One hundred and twenty-fourth street to forks	146,100		
Turning basin	42,300		
Total for dredging and dumpage	276,900, at	$0.25	$69,225
Superindendence and contingencies (about 12 per cent)			8,775
Grand total			78,000

As all funds now available for Government improvements on this river are needed to complete work already authorized and in progress, the above-described work will need new appropriations for the full $78,000.

Very respectfully,

W. H. BIXBY,
Lieut. Col., Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.

[Second indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., December 2, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

The within report contains an estimate of cost, amounting to $78,000, for deepening the Calumet River from One hundred and twenty-second street to the forks to a navigable depth of 20 feet, with a turning basin at the forks having a similar depth and a surface diameter of 750 feet.

Having in mind the marked commercial development of this locality in recent years, as explained in the Board's report reviewing that of the district officer on the preliminary examination, the Board is of opinion that the stretch of river under consideration is worthy of further improvement by the United States, and it therefore recommends that the project for the improvement of Calumet River be modified to include the work proposed within.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 350.

RAHWAY RIVER, NEW JERSEY.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF RAHWAY RIVER, NEW JERSEY.

DECEMBER 16, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 14, 1907.

SIR: I have the honor to transmit herewith a letter from the Acting Chief of Engineers, U. S. Army, dated December 13, 1907, together with copy of a report from Col. D. W. Lockwood, Corps of Engineers, dated August 20, 1907, of a preliminary examination of Rahway River, New Jersey, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 13, 1907.

SIR: I have the honor to submit herewith for transmission to Congress report of August 20, 1907, by Col. D. W. Lockwood, Corps of Engineers, upon preliminary examination of Rahway River, New Jersey, authorized by the river and harbor act of March 2, 1907.

Between 1879 and 1883 appropriations aggregating $37,000 were expended in dredging on this stream; the channel has since reverted to its original condition.

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I concur in the opinion of the local officer and the Board of Engineers for Rivers and Harbors that Rahway River is not worthy of further improvement by the General Government at the present time.

Very respectfully,

SMITH S. LEACH,
Acting Chief of Engineers.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF RAHWAY RIVER, NEW JERSEY.

UNITED STATES ENGINEER OFFICE,
New York City, August 20, 1907.

GENERAL: I have the honor to submit the following report upon a preliminary examination of the "Rahway River," made in compliance with Department letter dated March 14, 1907, and pursuant to the river and harbor act approved March 2, 1907.

The navigable part of the Rahway River extends from the city of Rahway, N. J., a distance of about 5 miles to the Arthur Kill, or Staten Island Sound, into which it empties. The tidal part of the river extends to the upper limits of the city of Rahway, where there is a pumping station established for the water supply of Rahway. The river is crossed by several bridges in the city of Rahway; the lowest one is a drawbridge located at Milton avenue. The next bridge up the river at Monroe (Main) street, one-fourth of a mile above Milton avenue and 5 miles from the mouth of the river, is a fixed bridge, and practical navigation is cut off at that point, above which there is a more rapid rise in the river bed and the bridges have fixed spans. Below Milton Avenue Bridge, which has two draw openings of 46½ feet, there are three drawbridges crossing the river at points about 2 miles, 1¾ miles, and one-eighth mile from the mouth of the river. These are the New Jersey Short Line Railroad Company, trolley (bascule type), the New York and Long Branch Division, and the Sound Shore Branch of the Central Railroad of New Jersey. These have draw openings of 65 feet, 47 feet, and 50 feet in width, respectively.

Before improvement by the United States in 1878 the Rahway River had a minimum depth of 8 feet at mean high water from its mouth to Bricktown, a distance of 3⅝ miles; thence a depth of 7 feet to Edgars dock, a distance of half a mile, thence 4.4 feet to Milton Avenue Bridge, a distance of five-eighths of a mile; thence 4 feet depth at high water to Monroe or Main Street Bridge, a distance of one-fourth of a mile. The mean range of tides is about 5 feet at the mouth of the river, and 4 feet at Milton Avenue Bridge.

The first survey of Rahway River was made in 1878, a report upon which is printed in the Annual Report of the Chief of Engineers for 1879, page 483, and a project based upon this survey was adopted by the river and harbor act of March 3, 1879, which appropriated $10,000 for beginning the work; this project provided for dredging a channel 125 feet wide from Bricktown to Milton Avenue Bridge, thence 100 feet wide to the Monroe Street Bridge, the depth to be 8 feet at mean high water, at an estimated cost of $36,653. This

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estimate was revised in 1882, when the cost was placed at $63,250. Work under this improvement was commenced in 1879 and was continued until 1883 under appropriations amounting to $37,000; the work was suspended in 1883 before completion of the project, and nothing has been done since that time. The work was dropped from the list of improvements by authority of the Department October 23, 1895. At that time the channel had reverted to its original condition.

At the close of work in 1883 a channel had been dredged 7 feet deep at mean high water, and from 50 to 100 feet in width, for a distance of about 3,800 feet up the river, extending to a point about 550 feet from Monroe Street Bridge.

A preliminary examination of Rahway River with a view to its further improvement was made in accordance with the requirements of river and harbor act of August 18, 1894, and a survey of the river was made in compliance with the provision of the river and harbor act of June 3, 1896. Reports upon this preliminary examination are printed in the Annual Report of the Chief of Engineers for 1895, page 1009, and in House Document No. 30, Fifty-third Congress, third session. The reports upon the survey of 1897 are printed on page 1187, Annual Report of the Chief of Engineers for that year, and in House Document No. 254, Fifty-fourth Congress, second session. The map accompanying the report of Maj. H. M. Adams, Corps of Engineers, dated January 25, 1897, to which attention is respectfully invited, illustrates approximately the present condition of the river. It appears from inquiry that there has been very little change in the depth. The only new feature is the erection of the New Jersey Short Line bridge in 1906 and 1907.

The improvements suggested in the reports of 1895 and 1897 referred to were not recommended as worthy to be undertaken by the United States, as there was little commerce in the river, and the cost was large in proportion to the possible benefits; the estimated cost in 1897 of making a channel 8 feet deep at mean high water and 100 feet wide from the vicinity of Bricktown to the head of navigation was $108,000. The improvement now desired is a channel 100 feet wide, about 12 feet deep at mean high water or about 8 feet at mean low water, and the cutting off of two bends situated at points half way between the Sound Shore Railroad and the New York and Long Branch Division of the Central Railroad of New Jersey, and about one-half a mile above the Central Railroad, respectively. There are few natural depths in the river which are as great as those now proposed, so that in order to obtain a channel of the desired dimensions dredging would be required throughout the entire navigable length of the river.

Commercial statistics have been requested from all parties known to be interested in this improvement, but very little has been obtained. Upon this examination I observed a small vessel unloading a cargo of bricks at the wharf of Mr. Charles Oliver, which is situated just above the Milton Avenue Bridge, and it is reported that a sloop makes on an average two trips each week to and from this wharf, and that brick scows make trips at very irregular intervals. The city of Rahway has a population of 10,000 inhabitants, and quite a large number of business interests are located here, but the river is suscep-

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tible only of a limited improvement, as is evidenced by the fact that the only projects considered in the past were with reference to a high-water depth, and such limited improvement would have little or no beneficial effect upon the interests referred to. Maintenance would be necessary and costly.

In my opinion, the Rahway River is unworthy of improvement by the General Government.

Letters have been written to all known interested parties informing them of this adverse report and requesting them, if they desired to do so, to submit their views to the Board of Engineers for Rivers and Harbors by September 7, 1907.

Very respectfully, your obedient servant,

D. W. LOCKWOOD,
Colonel, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.

[Second Indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., September 9, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

Rahway River is navigable to the town of Rahway, a distance of about 5 miles. Prior to 1879 it had a depth of 8 feet at mean high water up to Bricktown, 3⅝ miles, 7 feet to Edgars dock, 4½ miles, and 4 to 4¾ feet to Main Street Bridge, Rahway, five miles above the mouth. In 1879 the improvement of the stream was undertaken, with a view to securing a channel 100 to 125 feet wide and 8 feet deep to the Main Street Bridge at Rahway. A total of $37,000 was expended between 1879 and 1883, when the work was discontinued. A channel had been secured at that time 7 feet deep at mean high water (3 to 4 feet at mean low water), and 50 to 100 feet wide to within 550 feet of the head of navigation. The improvement did not result in any increase in commerce; on the contrary, the commerce appears to have declined after the improvement was made, and at the present time there is scarcely any. Since work was suspended the channel has reverted to its original condition.

The improvement now desired is a channel 100 feet wide and about 12 feet deep at mean high water, and the cutting off of two bends. To provide such a channel dredging would have to be carried on over practically the whole navigable river, as there are few natural depths greater than that proposed for the improvement. This work would be very expensive, as evidenced by an estimate submitted in 1897 for a channel 8 feet deep at mean high water, which amounted to $108,000. The portion to be dredged under that estimate was only about 1⅜ miles, while, as stated above, the whole distance of 5 miles would have to be dredged to secure a depth of 12 feet; moreover, the former examination developed evidences of ledge rock in certain localities at depths of about 8 feet below mean high water.

Information regarding commercial statistics does not appear to be very satisfactory or complete, but it is evident that there is but little traffic on the river and the communications received from those

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believed to be concerned indicate that the feeling in favor of the improvement is not unanimous even locally.

It is the opinion of the Board, based on all available information, concurring with the views of the district officer, that the probable cost of the desired improvement is very much in excess of the benefits that can reasonably be expected to result therefrom, and that it is not advisable for the United States to undertake the work.

For the Board:

H. F. HODGES,
Lieut. Col., Corps of Engineers,
Senior Member Present.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 351.

TENANTS HARBOR, MAINE.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF TENANTS HARBOR, MAINE.

DECEMBER 16, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 13, 1907.

SIR: I have the honor to transmit herewith a letter from the Acting Chief of Engineers, U. S. Army, dated December 12, 1907, together with copy of a report from Maj. Geo. A. Zinn, Corps of Engineers, dated October 14, 1907, of a preliminary examination of Tenants Harbor, Maine, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 12, 1907.

SIR: I have the honor to submit herewith for transmission to Congress report of October 14, 1907, by Maj. Geo. A. Zinn, Corps of Engineers, on preliminary examination authorized by the river and harbor act approved March 2, 1907, of Tenants Harbor, Maine, with a view to obtaining 8 feet of water.

From the facts and for the reasons given I concur in the opinion expressed by the division engineer and the Board of Engineers for

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Rivers and Harbors that this locality is not worthy of improvement by the United States. No recommendation is made by the district engineer officer.

Very respectfully,

SMITH S. LEACH,
Acting Chief of Engineers.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF TENANTS HARBOR, MAINE.

UNITED STATES ENGINEER OFFICE,
Portland, Me., October 14, 1907.

GENERAL: In accordance with instructions contained in Department letter of March 14, 1907, I have the honor to submit the following report upon a preliminary examination of "Tenants Harbor, with a view to obtaining 8 feet of water:"

Tenants Harbor, Maine, is located on the west side of the entrance to Penobscot Bay, about 10 miles south of Thomaston. On the Coast Survey chart it is shown as a village at the end of an arm of the bay extending westerly about 1⅛ miles from Tenants Harbor light, on the extreme easterly end of Southern Island.

An examination of Tenants Harbor was made in October, 1892, and a report thereon printed in House Executive Document No. 101, Fifty-second Congress, second session. This report seemed to pay most attention to the part of the harbor leading northerly to the granite quarries and known as Long Cove. In this report the opinion was expressed that Tenants Harbor is not worthy of improvement by the General Government.

A report of examination and survey of Long Cove was published in House Document No. 213, Fifty-ninth Congress, second session, in which, after a survey, map, and estimate had been made, the opinion was expressed that the harbor is not worthy of improvement by the United States.

This would seem to leave only the improvement of the channel from Tenants Harbor light up to the public landing at the village for consideration at the present time, and this I found to be the case upon my visit there. I visited Tenants Harbor village September 13, 1907, and talked with several representative citizens of the place and the captain of one of the Eastern Steamship Company's boats that makes regular trips to Tenants Harbor, "tide permitting." They all agreed that what they wanted was a channel up to the public landing so that a boat drawing 12 feet could come up freely at all stages of the tide, and they also agreed that there was a depth of about 11 feet at mean low water at the public landing and that it increased thence toward the light-house, except that about 600 feet below the landing there is a shoal with only 8½ feet of water, and, as this is a depth half a foot greater than that asked for in the act, there would seem to be no occasion for recommendation as to action by the United States.

There is submitted herewith copy of a letter * addressed to this office by W. E. Sheerer, postmaster, and a prominent general dealer of Tenants Harbor, in which he gives its relative importance, steamboat

* Not printed.

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service, etc. In this letter he says: "The improvement desired, which consists of 8 feet additional water, would give us a good safe harbor, with plenty of water." This would indicate a difference of opinion as to what is desired by some of the citizens and what is asked for in the act.

In this connection it might be mentioned that about one-quarter of a mile below the new public landing and also below the shoal before mentioned there is an old stone wharf, somewhat out of repair, which is to one side of the deep-water channel. A small amount of dredging could connect this landing with the channel, but such dredging would probably be regarded as of a private nature.

Very respectfully, your obedient servant,

GEO. A. ZINN,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

NORTHEAST DIVISION ENGINEER OFFICE,
New York, October 16, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army.

The report of October 18, 1892, printed in House Executive Document No. 101, Fifty-second Congress, second session, and that of June 22, 1906, in House Document No. 213, Fifty-ninth Congress, second session, lead me to the conclusion that Tenants Harbor, so far as considered in those reports, is not worthy of improvement by the General Government.

The within report covers improvement not considered in the reports above mentioned.

The improvement proposed in the act of March 2, 1907, is unnecessary, because a greater depth already exists than that specified in the act.

But the letter of W. E. Sheerer, accompanying this report, indicates that a depth of 8 feet not actual, but additional, may have been in mind. As arguments for this improvement he includes benefits to quarries already considered in the public documents above mentioned and not pertinent to a channel of approach to the village of Tenants Harbor. The other statistics furnished by him do not justify, at United States expense, a channel of 8 feet additional depth.

Tenants Harbor is not worthy of improvement by the General Government.

JOHN G. D. KNIGHT,
Colonel, Corps of Engineers,
Division Engineer.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., November 4, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

This harbor is described in a report unfavorable to its improvement submitted in 1892. Under the act of March 3, 1905, an examination and survey were made of Long Cove, which makes northward from

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near the entrance to Tenants Harbor. The conclusions reached regarding its improvement were also unfavorable.

The district officer states that a depth now obtains exceeding that called for by the present act, and that it would appear unnecessary to make further recommendation. In a letter accompanying the district officer's report it is stated that the improvement desired by residents of the locality is "8 feet additional water," and not "8 feet of water," as indicated in the act. The division engineer concurs in the opinion that the improvement proposed in the act is unnecessary because of the existence of a greater depth, and believes that an additional depth of 8 feet is not warranted by the interests involved.

Those known to be interested were given an opportunity to present their views to the Board regarding the necessity and advisability of the United States undertaking the improvement of this harbor, but as no communications have been received, it is assumed that the letter of Mr. W. E. Sheerer, to which reference has been made, contains all available information.

After reviewing all data available, the Board concludes that an improvement to a depth of 8 feet is unnecessary, as that depth now exists, and that the amount of commerce to be benefited is not sufficient to justify the United States in providing 8 feet additional depth.

For the Board:

R. L. Hoxie,
Colonel, Corps of Engineers,
Senior Member Present.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 395.

CRYSTAL RIVER, FLORIDA.

LETTER

FROM

THE ACTING SECRETARY OF WAR

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF CRYSTAL RIVER, FLORIDA.

DECEMBER 19, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 18, 1907.

SIR: I have the honor to transmit herewith, a letter from the Chief of Engineers, U. S. Army, dated December 16, 1907, together with copy of a report from Maj. Francis R. Shunk, Corps of Engineers, dated August 9, 1907, of a preliminary examination of Crystal River, Florida, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 16, 1907.

SIR: I have the honor to submit herewith for transmission to Congress report of August 9, 1907, by Maj. Francis R. Shunk, Corps of Engineers, on preliminary examination of Crystal River, Florida, authorized by the river and harbor act approved March 2, 1907.

Crystal River has been improved by the United States under a project adopted in 1902, which provided for a channel 6 feet deep at

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mean low water and 60 feet wide from the Gulf of Mexico to the town of Crystal River; this project was completed in December, 1906.

From the facts and for the reasons given I concur in the opinion expressed by the district officer, the division engineer, and the Board of Engineers for Rivers and Harbors that this locality is not worthy of further improvement by the General Government at the present time.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF CRYSTAL RIVER, FLORIDA.

UNITED STATES ENGINEER OFFICE,
Jacksonville, Fla., August 9, 1907.

GENERAL: I have the honor to submit report on a preliminary examination of Crystal River Florida, made in compliance with Department letter of March 14, 1907.

Five preliminary examinations have been previously made of Crystal River, and are published in the Reports of the Chief of Engineers for 1882, Part II, page 1317; 1889, Part II, page 1356; 1895, Part II, page 1577; 1897, Part II, page 1581; and 1900, Part III, page 2074. The first three reports were adverse to the improvement. The fourth and fifth reports were favorable. A survey of Crystal River was made in the fall of 1899, and a report thereof submitted June 27, 1900, by Capt. (now Maj.) Thomas H. Rees, Corps of Engineers, to the Chief of Engineers. A project for improvement was adopted by the river and harbor act of June 13, 1902. There is a mean rise and fall of tide at Crystal River of 2.3 feet.

The present examination was made by Mr. W. H. Caldwell, assistant engineer, from whose report I quote:

Crystal River empties into the Gulf of Mexico on the west coast of Florida about 6 miles southeasterly from Port Inglis, which is at the mouth of Withlacoochee River. The river lies wholly in Citrus County. Its source is a number of large springs about 7 miles up the river channel from the coast. It is a broad, clear stream, with considerable depth of water. The least depth at mean low tide is 6 feet, and the maximum, 15 feet. The river is a tidal estuary varying in width from 300 to 1,500 feet. At the river entrance, parallel to the coast, are a number of oyster reefs, some of which are underlaid with rock below a mean low-water depth of 5 feet.

I consulted persons who have shown an interest in the improvement, and masters of vessels frequenting the channel, whose local knowledge render their opinions of value. All of them desire that the existing navigable channel be widened to a least width of 100 feet. Others desire that the channel shall not only be increased in width to 100 feet, but also deepened to 8 feet at mean low water. Mr. John T. Rawls, who is manager of the Crystal River Lumber Company, stated that the channel would be of little practical benefit to his company until it was dredged 100 feet wide and 8 feet deep at mean low water. The lumber company has a mill at Crystal River on the water front, the daily output of which is about 100,000 feet of lumber. They export considerable lumber to Cuban and Central American ports. The lumber is now being shipped through Port Tampa and other ports, but the railroad rates from mill to seaboard are almost prohibitive. The company has made efforts to ship lumber to Cuba and Central America direct from Crystal River, and during the past year exported in that manner 2,102,424 feet. The vessels were anchored in the loading pool,

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about 6 miles off the mouth of the river, where the depth is 18 feet. From the loading pool there is a wide channel leading to the Gulf of Mexico. The least depth in the channel is 12 feet. The schooners engaged in the trade draw, loaded, about 11 feet. When light, the schooners draw about 6 feet. Were the channel leading into Crystal River deepened to 8 feet, three-fourths of the cargo for the schooners could be loaded into the vessels from the lumber company's wharves at the head of Crystal River. Of course it would be necessary to tow the vessels out of the river at high tide. Under existing conditions not more than 20 per cent of the cargo can be loaded into the vessels at the lumber wharves, and even then it is hazardous towing the vessels in and out, owing to the narrowness of the channel. The channel is only 60 feet wide.

The following is a tabulated statement of commercial statistics of Crystal River for the twelve months ending December 31, 1906:

Article.	Weight.	Value.
	Tons.	
Fiber, palmetto	150	$10,000.00
Fish and oysters	250	7,500.00
General merchandise	150	300,000.00
Logs, cedar	2,485	80,134.50
Lumber, pine	5,256	31,536.34
Total	8,291	429,170.84

Vessels engaged in trade number 28, consisting of 1 tugboat, 6 barges, 3 schooners, 3 launches, and 15 fishing boats. Percentage of total trade of neighborhood carried by water is about 20.

The above statistics and data were furnished me by Mr. C. E. Herrick, agent of the Joseph Dixon Crucible Company, Crystal River, Fla., and Mr. John T. Rawls, manager Crystal River Lumber Company, Crystal River, Fla.

Crystal River has been improved by the United States under the project adopted in 1902, which provided for a channel 6 feet deep at mean low water and 60 feet wide from the Gulf of Mexico to the town of Crystal River. This project was completed in December, 1906. There is now a channel of the full dimensions called for from the Gulf of Mexico to the head of navigation at the town of Crystal River.

The improvement of Crystal River might be undertaken for either of two purposes—to provide a practicable channel for inland navigation, or to make the town of Crystal River accessible to light-draft seagoing vessels. The work hitherto done by the Government has had the first-named object in view. The real port for seagoing vessels is at the anchorage in the Gulf of Mexico beyond the mouth of Crystal River. The channel from the town of Crystal River to this anchorage is of the nature of an inland route, by which the produce of the country is taken in light-draft vessels to the anchorage and there transshipped.

It was expected when this work was undertaken that there would be a great increase in the export of phosphate, which is mined in the surrounding country, and I think that the work was favorably reported largely because of this expectation; in support of this statement I would refer to the report of Capt. Thomas H. Rees, Corps of Engineers, Report of the Chief of Engineers for 1900, Part III, page 2074. In fact no phosphate has been exported by way of Crystal River. This is because a more convenient route is afforded by the Withlacoochee River, whose mouth is about 6 miles distant from that of Crystal River.

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It is my opinion that the channel already provided is ample for the purpose intended, viz, to provide a channel for river navigation between the town of Crystal River and the anchorage. No further improvement would be of much additional benefit unless such depth were provided as would enable light-draft seagoing vessels to reach the town of Crystal River. I do not think that the commerce of Crystal River, present or prospective, is sufficient to warrant the expense of securing such depth.

The tonnage for the past few years has been as follows:

1902	1,785
1903	725
1904	6,875
1905	7,474
1906	8,291

The increase since 1903 has undoubtedly been due to the availability of the channel provided under the project. In my judgment there is not much prospect of such increase as could not be accommodated by the present channel.

The improvement of this stream, with a view to making Crystal River a port for light-draft seagoing vessels, must be considered in connection with the improvement of the Withlacoochee River, which is in the near vicinity. The Withlacoochee River is under improvement by the United States, with a view to obtaining a depth of 10 feet at mean low water from the Gulf of Mexico to Port Inglis. As before remarked, the mouth of Withlacoochee River is about 6 miles from the mouth of Crystal River, and the same anchorage is used for both streams. The mean range of tide is 2.8 feet. The port will therefore be accessible to vessels drawing 12 feet of water. The seaborne commerce of Withlacoochee River is rapidly increasing, and I think there is no prospect of the traffic in phosphate, lumber, etc., being diverted to Crystal River, nor do I think it is desirable that it should be. I do not think that this portion of Florida is at present in need of two ports so close together as Port Inglis and Crystal River. For these reasons it is my opinion that Crystal River is not worthy of further improvement by the United States.

Respectfully submitted.

FRANCIS R. SHUNK,
Major, Corps of Engineers.

Brig. Gen. A MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

OFFICE OF DIVISION ENGINEER, SOUTHEAST DIVISION,
Savannah, Ga., August 12, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army.

I agree with the district officer in his opinion that Crystal River, Florida, is not worthy of further improvement at this time.

DAN C. KINGMAN,
Lieut. Col., Corps of Engineers,
Division Engineer, Southeast Division.

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[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., September 3, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

The physical and commercial conditions at this locality are quite fully described in the within and other reports of preliminary examinations made by direction of Congress. Following a favorable report on a survey submitted in 1900, a project was adopted for the improvement of Crystal River having in view a channel 6 feet deep at mean low water and 60 feet wide extending from the Gulf to the town of Crystal River, a distance of about 6¼ miles. The district officer states that this project was completed in December, 1906, and that a channel of the full project dimensions is now available. The principal interests now desire that the channel be widened to 100 feet and deepened to 8 feet.

The commerce of the locality is reported to amount to about 8,000 tons, the principal items of which are cedar logs and pine lumber. This commerce is lightered to a deep anchorage or loading pool about 6 miles from the mouth of the river where it is transferred to ocean vessels. This anchorage is also the point of transfer for the commerce lightered to and from the Withlacoochee River, for the benefit of which a connecting channel is now under improvement to a depth of 10 feet.

It appears that at the time of the former examination and survey, which resulted in the adoption of the existing project, a great increase in commerce was anticipated to arise from the receipt and shipment of phosphate, but this expectation has not been realized. The commerce of the river is still small and no part of it is phosphate. Large quantities of this product are, however, being shipped from the Withlacoochee River, the mouth of which is only 6 miles distant, and it is not probable that Crystal River would be used for this purpose even if the navigation facilities were improved.

The existing depth of 6 feet is sufficient to afford a fairly good barge navigation, and in the opinion of the Board, neither the existing nor prospective commerce warrants a more extensive improvement.

In view of the foregoing, the Board concurs with the district officer and division engineer in believing that Crystal River is not worthy of further improvement by the General Government.

For the Board.

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 396.

HORN HARBOR, VIRGINIA.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION AT THE MOUTH OF HORN HARBOR, VIRGINIA.

DECEMBER 19, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 18, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, United States Army, dated December 16, 1907, together with copy of a report from Maj. Spencer Cosby, Corps of Engineers, dated July 25, 1907, of a preliminary examination of Horn Harbor, Virginia, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 16, 1907.

SIR: I have the honor to submit herewith, for transmission to Congress, report of July 25, 1907, by Maj. Spencer Cosby, Corps of Engineers, on preliminary examination authorized by the river and harbor act approved March 2, 1907, of Horn Harbor, Virginia, with a view to removing sand bar at its mouth.

From the facts and for the reasons given I concur in the opinion expressed by the district officer, the division engineer, and the Board of Engineers for Rivers and Harbors that this locality is not worthy of improvement by the General Government at the present time.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

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PRELIMINARY EXAMINATION AT THE MOUTH OF HORN HARBOR, VIRGINIA.

UNITED STATES ENGINEER OFFICE,
Washington, D. C., July 25, 1907.

GENERAL: In compliance with instructions from the Chief of Engineers, I have the honor to submit the following report of a preliminary examination of "Horn Harbor, with a view to removing sand bar at its mouth," made in accordance with the requirements of the river and harbor act approved March 2, 1907:

A cursory inspection of the locality was made by me on July 20, 1907. The detailed examination of the harbor was made April 26, 1907, by Assistant Engineer F. C. Warman. On that day he also held a hearing in the harbor, which had been announced by means of notices posted in prominent places and by letters to interested parties. Twenty persons were present and appeared much interested in the proposed improvement. The data reported herein are chiefly from Mr. Warman's report.

GENERAL DESCRIPTION OF LOCALITY.

Horn Harbor is a tidal estuary of Chesapeake Bay, which it enters from the western shore about 4 miles above New Point Comfort. It is located entirely in Mathews County, Va., and has a total length of about 3 miles, while its width gradually increases from a few hundred feet at the upper end to about half a mile at its mouth.

The adjoining country is without railroads and is practically dependent upon water transportation. The nearest railroad is at Cape Charles City, 15 miles distant, across Chesapeake Bay, and considerable material is shipped from there to Horn Harbor, and vice versa.

There are several small landings for light-draft vessels in Horn Harbor. The nearest wharves of regular line steamers are Diggs wharf on East River (a tributary of Mobjack Bay) and New Point Comfort wharf at the junction of Chesapeake and Mobjack bays. The distance from the headwaters of Horn Harbor across to Diggs wharf is but little over a mile. The connecting roads are good in summer and poor in winter. A daily steamer schedule is maintained between Diggs wharf and Norfolk. The distance from Horn Harbor to New Point Comfort wharf is about 4 miles, and the roads are poor in summer and almost impassable in winter. Steamers are scheduled to stop at this wharf only during the summer season, and the greater portion of the shipments from the wharf are taken there by small boats.

The greatest area of country which can be considered tributary to Horn Harbor extends back about 3 miles from its shores. The population of this tributary area is about 1,000, and the principal occupations of the residents are fishing, oystering, and crabbing, while farming is of secondary importance. There are about 17 stores in the locality. The soil is said to be "very fair for Mathews County." Sweet and white potatoes and truck-garden produce are the principal crops raised.

The general depth of water inside the harbor is from 6 to 7 feet at low tide. The 6-foot depth covers an area almost a quarter of a mile wide, extending up the harbor nearly 2 miles, while there is a basin with an 8-foot depth about 200 feet wide and one-fourth of a mile

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long. There is a small area inside the bar but just outside the mouth of the harbor with a maximum depth of 17 feet. The portions of the above areas which are best suited for anchorage are, however, not landlocked, but are situated in Chesapeake Bay outside the general shore line. Vessels anchored there are, however, protected from the full force of the sea by the outer bar and the reefs. The mean range of tides is about 2½ feet and the bottom within the harbor is soft.

OBSTRUCTION TO NAVIGATION.

The obstruction to navigation in Horn Harbor consists of a hard sand bar located in Chesapeake Bay, separating the above-described deep areas from deep water in the bay. The ruling depth over the crest of the bar is from 3½ to 4 feet at low tide. Its length between 9-foot contours is about 2,500 feet, and between 7-foot contours about 1,500 feet.

This bar is said to have remained very nearly as it is for at least the last forty years, although it is filled up somewhat by easterly winds and cut out again by westerly winds, and occasionally shifts its position slightly during severe storms.

PREVIOUS OPERATIONS.

As far as known, no work of improvement has ever been undertaken at this locality, either at public or private expense, and no previous examination or survey of the harbor, with a view to its improvement, has ever been made.

IMPROVEMENT DESIRED.

The improvement desired is the dredging and maintenance of a channel 9 feet deep at low water and 150 wide through the bar in Chesapeake Bay, which now prevents access to the harbor. Owing to the fact that this bar is composed of shifting material, which changes somewhat in position under the effect of storms, it is thought that a channel could not be economically maintained without the construction of a jetty, which would probably have to be about a mile long and would certainly be expensive.

PRESENT COMMERCE.

At present commerce is carried on in small sailing vessels, gasoline launches, and sailing canoes of from 1 to 20 gross tons, and shipments are chiefly made to Cape Charles City (where the articles are transshipped to Baltimore, Philadelphia, and New York) and to Diggs and New Point Comfort wharves (whence the articles are carried to Norfolk). The principal articles of commerce are fish, oysters, farm produce, crabs, and general mechandise. During 1906 the receipts and shipments amounted to about 3,000 tons and were estimated to be worth about $120,000. Ten small sailing vessels, 40 gasoline launches, and 60 sailing canoes belong in Horn Harbor. It is stated that the development of the trucking industry is retarded by uncertainties as to shipment.

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PROSPECTIVE COMMERCE AND BENEFITS.

It is claimed that the improvement of this harbor would add greatly to the fishing and trucking industries of the locality by increasing the regularity and safety of shipments.

The improvement is mainly desired, however, to afford a harbor of refuge for small vessels which happen to be caught in the violent storms that often occur in this locality. These vessels are sometimes unable to make their way to Mobjack Bay, or Piankatank River, and wrecks have several times occurred in this vicinity.

The opening of the Chesapeake Bay entrance to Milford Haven about 7 miles north of Horn Harbor would probably afford a better harbor of refuge, in that it is landlocked, more commodious, and open at the Piankatank River end as well as on Chesapeake Bay, while the cost of the work would be less than that required at Horn Harbor. It is, however, claimed by residents of the latter that it is needed as a harbor of refuge regardless of whether Milford Haven is thus improved or not. As Mobjack Bay, only 4 miles south of Horn Harbor, now affords a fair refuge for vessels in storms, the opening up of Horn Harbor does not appear to be imperatively needed from this point of view.

CONCLUSIONS.

The improvement of Horn Harbor would unquestionably be of benefit to the residents of the vicinity, in facilitating the shipment of their produce and supplies, and would also add somewhat to the safety of small vessels navigating this portion of Chesapeake Bay.

On the other hand, Diggs wharf on East River is a good shipping point at a not unreasonable distance, and New Point Comfort wharf and Cape Charles City are both accessible to the boats now in use, so that additional shipping facilities, while they would be a convenience, are not imperatively needed. The amount of commerce involved is very small in proportion to the probable cost of the improvement requested.

The harbor of refuge would be a comparatively expensive one to construct; and as there is already a fair harbor 4 miles to the south and a good one about 10 miles to the north, the need of an additional harbor of refuge in this vicinity does not seem urgent.

It is therefore my opinion that Horn Harbor is not at present worthy of improvement by the General Government.

Very respectfully,

SPENCER COSBY,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

U. S. ENGINEER OFFICE, EASTERN DIVISION,
New York City, July 30, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army, concurring in the views and opinion of the district officer.

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Division Engineer.

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[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., August 19, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

Horn Harbor is a tidal estuary of Chesapeake Bay, located in Mathews County, Va. There are no towns upon its banks, and the population of the tributary country is said to be about 1,000, whose principal occupation is fishing and gathering oysters and crabs.

There is a considerable area within the harbor with a depth of from 6 to 7 feet, which is separated from Chesapeake Bay by a sand bar having on its crest a depth of 3 to 4 feet. The improvement desired is stated to be a channel 9 feet in depth through this bar, the expected results being a more regular and better boat service for handling the products of the community and the creation of a harbor of refuge for small vessels engaged in trade and in fishing in the vicinity.

The principal articles of commerce are fish, oysters, farm produce, and general merchandise, reported to have amounted in 1906 to about 3,000 tons. This being an old and settled community with no manufactures or commercial industries to create and foster an extensive commerce, no material increase can reasonably be expected.

Located about 1 mile from the head of the harbor is Diggs wharf, on East River, between which point and Norfolk a daily steamer schedule is maintained. There are also within a few miles other points from which shipments are made.

The proposed work would be located in an exposed position, where an improvement to have any degree of permanency would probably require the protection of a jetty or breakwater of considerable length, the cost of which would be very great when compared with the character and extent of the business of the community.

A harbor of refuge at this place would no doubt be a great convenience and of some value in protecting the small craft plying these waters, but when the existence of a fair harbor 4 miles to the south of Horn Harbor, the probability of a better site for a harbor of refuge 7 miles to the north, and the cost of a harbor of refuge at Horn Harbor are taken into account the necessity and advisability of the proposed improvement are not apparent.

Based on the above stated facts the Board has arrived at the conclusion, concurring with the views of the district officer and the division engineer, that Horn Harbor is not at the present time worthy of improvement by the United States.

Those known to be interested in this subject were notified by the district officer that they might submit statements or arguments to the Board bearing upon the necessity and advisability of the proposed improvement, but none have been received.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 397.

PAGAN RIVER, VIRGINIA.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION, WITH PLAN AND ESTIMATE OF COST OF IMPROVEMENT, OF PAGAN RIVER, VIRGINIA.

DECEMBER 19, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 17, 1907.

SIR: I have the honor to transmit herewith a letter from the Acting Chief of Engineers, U. S. Army, dated 14th instant, together with copies of reports from Maj. Joseph E. Kuhn, Corps of Engineers, dated August 1 and October 18, 1907, of a preliminary examination of Pagan River, Virginia, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 14, 1907.

SIR: I have the honor to submit herewith, for transmission to Congress, reports of August 1, 1907, and October 18, 1907, by Maj. Joseph E. Kuhn, Corps of Engineers, on preliminary examination, with plan and estimate of cost of improvement, authorized by the river and harbor act approved March 2, 1907, of Pagan River, Virginia, with a view to straightening and deepening the channel.

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Under appropriations made by Congress there has been obtained a navigable channel 40 feet wide and 10 feet in depth at mean low water from the mouth of Pagan River for a distance of about 9 miles—to Smithfield, the head of navigation.

The present available depth of 10 feet is regarded as sufficient so far as existing navigation is concerned.

The improvement contemplated by the reports now under consideration has for its object to straighten the channel by increasing the available width at certain sharp bends or angles. The cost of the dredging proposed is estimated at $4,600, with about $1,000 annually for maintenance after completion.

I concur in the opinion expressed by the district officer, the division engineer, and the Board of Engineers for Rivers and Harbors that Pagan River is worthy of further improvement to the extent indicated.

Very respectfully,

SMITH S. LEACH,
Acting Chief of Engineers.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF PAGAN RIVER, VIRGINIA.

ENGINEER OFFICE, UNITED STATES ARMY,
Norfolk, Va., August 1, 1907.

GENERAL: Complying with instructions contained in Department letter of March 14, 1907, I have the honor to submit the following report upon the preliminary examination of "Pagan River, with a view to straightening and deepening channel," as directed by Congress in the river and harbor act of March 2, 1907.

Pagan River is a tributary of the James River, entering from the right bank about 7 miles above Hampton Roads. The head of navigation is at Smithfield, about 8 miles from the channel in the James River.

Pagan River is a tidal stream with a normal tidal range of 2.6 feet. The river varies in width from 4,500 feet at the mouth to a little over 100 feet at Smithfield wharves. The navigable channel is narrow at all points, being bordered by extensive tidal flats in the wider parts of the stream. The river banks alternate from side to side between high and well defined clay banks and marshy areas.

In the first 2 miles of the river below Smithfield are three sharp bends, approximately 90 degrees. These sharp bends, with the existing narrow channel, constitute the chief difficulties in navigation, and concerning which the navigation interests complain.

Two steamers of the Old Dominion Line make regular daily trips between Smithfield and Norfolk. Besides these steamers there is a considerable fleet of small boats, sail and power, which carry the products of the territory adjacent to the river to the market at Norfolk.

Smithfield is the only town on the river. It is a prosperous community, with water works, sewers, and gas plant. It has two banks, which are reported to do a business of several millions yearly.

The territory traversed by the river is a productive trucking region, while the tidal flats in the river itself are utilized for oyster culture. The nearest railroad station to Smithfield is 15 miles distant, and this

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town and the farms along the river banks, representing a population of about 5,000, are wholly dependent upon water transportation for marketing their products and for receiving their supplies. The commerce of the river is considerable both in tonnage and value. The principal items are peanuts, oysters, farm truck, hog products, lumber, and brick. Smithfield hams and bacon have an extensive reputation, and the shipment of hog products constitutes no small element in the commerce.

The annual commerce for the calendar year 1906, as recently compiled in a report of the Business Men's Association of Smithfield, was as follows:

Article.	Quantity.	Value.
	Tons.	
Live stock	250	$62,500
Lumber	15,000	90,000
Brick	400	3,200
Small farm truck	225	10,000
Fertilizer	4,000	80,000
Peanuts	31,560	2,964,939
Potatoes	6,000	90,000
Melons	500	15,000
Gasoline	50	3,000
Coal	2,500	10,000
Oysters	1,750	16,000
Miscellaneous, hams, dry goods, flour, hay, etc	55,387	4,151,010
Total	117,622	7,495,649

In addition to the above, 38,500 passengers were carried by boats during the year 1906.

The commercial statistics as reported for other years are as follows:

1901	108,058
1902	75,614
1903	120,121
1904	85,078
1905	82,207

Being a settled community with fairly definite resources, the annual commerce depends mainly upon the success of the peanut and other farm crops.

The act of Congress approved June 6, 1900, directed an examination of "Pagan River from Smithfield, Va., to James River, with a view to securing a channel 80 feet wide and 10 feet deep at mean low tide, or such improvement as may be found expedient." Reports on the examination and survey made in compliance with the act referred to were made by Col. James B. Quinn, Corps of Engineers, and may be found on page 1475 et seq. of the Annual Report of the Chief of Engineers for 1901. Colonel Quinn submitted an estimate of $36,088 for securing a channel 10 feet deep and 80 feet wide, and an estimate of $28,870 for a channel 8 feet deep and 80 feet wide.

Prior to the examination and survey mentioned, Congress had appropriated, in 1880 and 1881, an aggregate of $10,000, with which the bar at the mouth and several inside bars were dredged to a depth of 8 feet.

The act of June 13, 1902, appropriated $10,870 for improving Pagan River in accordance with Colonel Quinn's report. The appropriation made by the act of June 13, 1902, was not applied to any

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work until 1905, Congress having in the meantime, in the act of March 3, 1905, provided that—

> The Secretary of War, may, in his discretion, expend the balance remaining to the credit of said improvement, with a view to securing a channel width of not less than 40 feet and such depth as may be obtained without exceeding said balance.

Under the authority thus granted, a 10-foot channel, 40 feet wide, was dredged in 1905 and 1906 through the bar at the mouth of the river, and through several shoals in the first 4 miles below Smithfield.

So far as the existing navigation is concerned, the present available depth of 10 feet would be sufficient, provided the channel were of greater cross section. Steamers of the draft and beam now navigating the river occupy so large a part of the cross section of the waterway that they have difficulty in keeping the channel. An increase of width in the existing channel would, in my judgment, be more beneficial than any increase of depth, both in securing a greater cross section of channel and making it easier to take the bends. Unfortunately, the language of the law directing the examination precludes consideration of any increase in the width of channel, and any increase of the cross-sectional area will have to be secured through further deepening. The two steamers engaged on the river draw about 8 feet when fully loaded and are of over 300 tons net.

Having in view the considerable commerce of this small stream, the dependence of the business interests upon water transportation, and the probable reasonableness of cost for securing a straighter and somewhat easier channel, I am of the opinion that Pagan River is worthy of further improvement, "with a view to straightening and deepening channel."

I recommend that I be authorized to prepare plan and estimate of cost, which can be done without further expenditure of funds, from a detailed survey made in 1903.

Respectfully submitted.

JOSEPH E. KUHN,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

OFFICE OF DIVISION ENGINEER, SOUTHEAST DIVISION,
Savannah, Ga., August 5, 1907.

Respectfully submitted to the Chief of Engineers, U. S. Army.

I agree with the district engineer that this river is worthy of further improvement and recommend that he be authorized to prepare estimate of cost.

DAN C. KINGMAN,
Lieut. Col. Corps of Engineers,
Division Engineer, Southeast Division.

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[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., August 12, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

Under improvements already made it appears that this stream now carries an available depth of about 10 feet, but with a width of only about 40 feet, which the district officer states is not sufficient, particularly at the bends, to accommodate boats of the size now using the stream.

This waterway is of considerable commercial importance, having a general commerce reported within as amounting to about 117,000 tons, valued at about $7,500,000. Two steamers make regular daily trips between Smithfield, the head of navigation, 8 miles from the mouth, and Norfolk, and these are reported to have a loaded draft of about 8 feet.

The district officer states that in his opinion, in which the division engineer concurs, Pagan River is worthy of further improvement, and recommends that authority be given to prepare a plan and estimate of cost, which can be done without a survey or further expenditure of funds. He states that an increase in width in the existing channel would be more beneficial than an increase in depth. While the act makes no specific reference to widening the stream, the Board believes that sufficient leeway is given by the use of the word "straightening" to permit of such widening as may be necessary at bends and curves, obviously where most needed, and by this common method of easing the bends the stream will be both straightened and widened.

Believing that the improvement now desired can probably be effected at reasonable cost, and that the commercial interests involved are sufficient to warrant some further expenditure by the General Government, the Board concurs with the district officer and the division engineer in recommending that an estimate be prepared.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

[Fourth indorsement.]

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, August 15, 1907.

Respectfully submitted to the Secretary of War.

This is a report on preliminary examination of Pagan River, Virginia, authorized by the river and harbor act of March 2, 1907.

Inviting attention to the report of the Board of Engineers for Rivers and Harbors in the preceding indorsement, I recommend that a plan and estimate of cost of improving the locality as proposed be authorized.

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

[Fifth indorsement.]

WAR DEPARTMENT,
August 16, 1907.

Approved as recommended by the Chief of Engineers.

ROBERT SHAW OLIVER,
Assistant Secretary of War.

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PLAN AND ESTIMATE OF COST OF IMPROVEMENT OF PAGAN RIVER, VIRGINIA.

ENGINEER OFFICE, UNITED STATES ARMY,
Norfolk, Va., October 18, 1907.

GENERAL: Complying with instructions contained in Department letter dated August 20, 1907, I have the honor to submit the following report on plan and estimate for the further improvement of the Pagan River, Virginia.

A preliminary examination of this stream was directed by Congress in the river and harbor act approved March 2, 1907, "with a view to straightening and deepening channel," and the preparation of a plan and estimate of cost authorized by the Secretary of War under date of August 16, 1907.

An accurate survey of the river from Smithfield, Va., to its junction with the James River was completed in 1903, in connection with certain improvements contemplated at that time, and this survey has been used as a basis for the present plan and estimate.

Having reference to the tracing[a] transmitted herewith, which embraces all that portion of the Pagan River below Smithfield where navigation is inconvenienced, it will be observed that at and immediately below Smithfield there are two sharp bends in the channel. A pocket of deep water exists at the bend at Smithfield, and vessels would ordinarily not encounter any difficulty in taking the turn were it not for the fact that this deep water adjoins a part of the city wharves at which a considerable number of vessels, at times, lie moored. When several vessels lie abreast of each other at this point, as sometimes happens, boats trying to make the turn are crowded against the convex bank and experience difficulty in passing the bend. To remedy this difficulty it is proposed to widen the channel and, at the same time, to ease the bend by dredging a cut 40 feet wide and 10 feet deep at low water, located as shown.

At the bend located about one-half mile below Smithfield the conditions are decidedly unfavorable, since vessels, on leaving the natural deep-water pocket at this point to enter the narrow dredged channel, must make almost a right-angle turn in order to keep in the 10-foot channel. In order to remedy this it is proposed to connect the deep-water pocket with the existing dredged channel by a parallel cut 40 feet wide and 10 feet deep in the south side. With this modification, vessels should have no difficulty in negotiating the turn at this point.

About 2 miles below Smithfield there is another sharp bend, but as the channel is here wide and deep, no inconvenience is encountered in taking the turn.

Below the bend last mentioned the channel is a dredged cut nearly 1½ miles long, 40 feet wide, and 10 feet deep at low water, with 4 angles. The various reaches of this dredged channel are marked by shore ranges, and there is no trouble in holding the proper course in clear weather. Owing to the narrowness of the channel, however, steamers frequently bring up in the angles. To remedy this it is proposed to cut off the angles of the channel by triangular cuts measuring 60 feet at the apex, so as to make the channel 100 feet wide at the turn, and narrowing gradually to 40 feet in the straight reaches.

[a] Not printed.

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The estimated quantities of material to be removed, scow measurement, are as follows:

	Cubic yards.
At Smithfield	5,518
At bend one-half mile below Smithfield	5,926
Easing angles in dredged channel 2 miles below Smithfield	6,956
Total	18,400

On account of the scattered areas in which dredging is proposed and the distance to which the dredged material must be towed, the cost per cubic yard will be relatively high. It is estimated that it will cost 25 cents per cubic yard to remove the material from the localities indicated, making the cost of the work $4,600.

Pagan River is not subject to freshets and carries but little sediment. Dredged channels will therefore remain reasonably permanent, and will be subject only to a slight annual deterioration due to a gradual filling in of the dredged cuts, aided by the action of passing steamers in the narrow channel. It is estimated that an expenditure of $5,000 at intervals of five years will suffice to maintain the present navigable channel of 10 feet depth and 40 feet minimum width.

I am unable to add any facts additional to those already given in the report on the preliminary examination which have any bearing upon the merits of the proposed improvements.

After considering all available data and the reasonableness of cost of the improvements as shown above, I am of the opinion that Pagan River is worthy of further improvement to the extent outlined.

Respectfully submitted.

JOSEPH E. KUHN,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

OFFICE OF DIVISION ENGINEER, SOUTHEAST DIVISION,
Savannah, Ga., October 23, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army.

I concur with the district officer in his opinion that the Pagan River worthy of further improvement to the extent which he proposes.

DAN C. KINGMAN,
Lieut. Col., Corps of Engineers,
Division Engineer, Southeast Division.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., October 28, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

Based on available data, the district officer submits a plan for improving the navigation of Pagan River by straightening the channel at the bends, at an estimated cost of $4,600, and states that the improvement can probably be maintained at an expense averaging about $1,000 per year.

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Considering the amount and value of the commerce involved, this expenditure seems reasonable, and therefore the Board concurs with the district officer and the division engineer in recommending the adoption of the project proposed within.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 398.

DUCK ISLAND HARBOR, CONNECTICUT.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORTS OF EXAMINATION AND SURVEY OF HARBOR OF REFUGE AT DUCK ISLAND, INCLUDING KELSEYS POINT, CONNECTICUT.

DECEMBER 21, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed, with accompanying illustration.

WAR DEPARTMENT,
Washington, December 20, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated 19th instant, together with copies of reports from Maj. Harry Taylor, Corps of Engineers, dated April 29 and October 29, 1907, of a preliminary examination and survey, respectively, of harbor of refuge at Duck Island, and in connection therewith for a breakwater at Kelseys Point, Connecticut, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 19, 1907.

SIR: I have the honor to submit herewith, for transmission to Congress, reports of April 29, 1907, and October 29, 1907, with map, by Maj. Harry Taylor, Corps of Engineers, on preliminary examination and survey, respectively, authorized by the river and harbor act

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approved March 2, 1907, of harbor of refuge at Duck Island, and in connection therewith for a breakwater at Kelseys Point, Connecticut.

The project for improvement of this locality, now in course of execution, provides for the creation of a harbor of refuge in the rear of Duck Island, Connecticut, by the construction of three riprap breakwaters. Of these structures only one, the largest, has been commenced, and this one is not built up to full cross section and lacks about 300 feet of its projected length of 3,000 feet.

As a result of the present investigation it is proposed to complete the present breakwater to full projected cross section, but without extending same beyond its present termination; also, in lieu of the two additional breakwaters of the present project, to substitute two breakwaters in different locations, including one at Kelseys Point, all as shown on the accompanying chart. The estimated cost of the additional work contemplated under this revised plan is $350,000, or practically the same as the amount estimated to complete the existing project. An estimate for maintenance of $5,000 once in ten years is also submitted.

It appears that, if located in accordance with this revised plan, the breakwaters would offer better protection to all classes of vessels, and I concur in the opinion of the district officer, the division engineer, and the Board of Engineers for Rivers and Harbors that this locality is worthy of further improvement in the manner now proposed.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF HARBOR OF REFUGE AT DUCK ISLAND, CONNECTICUT, AND IN CONNECTION THEREWITH FOR A BREAKWATER AT KELSEYS POINT.

ENGINEER OFFICE, UNITED STATES ARMY,
New London, Conn., April 29, 1907.

GENERAL: I have the honor to submit the following report of a preliminary examination of Duck Island Harbor, Connecticut, in compliance with the following item in the act of Congress approved March 2, 1907:

A further examination and survey for a harbor of refuge at Duck Island, and in connection therewith for a breakwater at Kelseys Point, Connecticut.

Duck Island Harbor is a small bay on the north shore of Long Island Sound, about 7 miles west of the mouth of the Connecticut River, and approximately midway between the harbors of New London and New Haven, between which the distance, measured from the entrance to New London Harbor to the breakwaters at New Haven, is about 40 nautical miles. The distance from Kelseys Point on the west side of Duck Island Harbor to Menunketesuck Point on the east side is about 2½ miles, and the distance from the straight line joining these two points to the high-water line in the middle of the harbor is very nearly seven-eighths of a mile. Duck Island, which lies just outside of the straight line joining the two points named above, has a width, east and west, of about 250 feet, and a length, north and south, of about 800 feet.

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In its original condition practically no shelter was afforded by this harbor in winds from the east around through the south to the west. Good protection was afforded from all winds coming from the north, the bay being in this case under the lee of the mainland. Inside of the bay depths as great as 40 feet exist over a limited area, and a considerable portion of the bay has depths of 15 to 17 feet. The bottom is generally sand or mud and affords good holding ground.

The existing project for the improvement of this harbor, which was adopted by the river and harbor act of September 19, 1890, provides for the construction of three riprap breakwaters—one with a length of 3,000 feet, extending in a westerly direction from Duck Island; one with a length of 1,750 feet, extending in a northeasterly direction from Duck Island; and a third with a length of 1,130 feet, extending in a westerly direction from Menunketesuck Point. The distance or opening between the latter two breakwaters would be about 700 feet. The harbor thus provided would be well protected from all southerly storms and fairly well protected from storms coming from the south around to the east. Some protection would also be afforded from storms from the southwest, but almost none from westerly storms. The estimated aggregate cost of this project is $463,540. Under this project $116,309.25 has been expended, of which $5,334.10 has been for maintenance. The breakwater extending westerly from Duck Island has been built to a distance of 2,770 linear feet, although not to the full cross section contemplated by the project.

The protection afforded by the work thus far completed is only from storms coming from the south. The harbor still remains in its original condition as far as protection from the east is concerned, and the work thus far done has given only a very limited protection from southwesterly storms, the benefit growing smaller as the direction of the storm approaches the west; but even in its partially improved condition this harbor has been of very great benefit to the commerce of Long Island Sound.

The commerce which is interested in the improvement of this harbor is mainly that part of that passing through Long Island Sound that consists of the smaller sailing vessels and tows, but which form a very considerable part of the whole commerce of the Sound. No records of the number of vessels frequenting this harbor have been kept for several years until very recently, but since the 1st of February, 1907, the keeper of the light at Duck Island has been furnishing me a daily report of the number of vessels using this harbor, and his reports show that from February 1 to April 28, 1907, 186 vessels entered the harbor. The greater portion of these vessels were schooners, but many of them were tugs with tows of barges. Few of them stayed more than a few hours, the harbor having been sought purely as a temporary refuge. Had there been a better harbor, more vessels would doubtless have used it.

Since the project for the improvement of this harbor was adopted conditions have materially changed as to the size of vessels engaged in the commerce of Long Island Sound, and in my opinion the location of the breakwaters should be reconsidered, with a view to offering better protection to all classes of vessels and as good protection as possible at a reasonable cost to the deeper-draft towboats and barges.

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A breakwater built across the shoals south of Kelseys Point would shelter the harbor from westerly storms, the direction now most exposed, and is properly a part of any project for forming a harbor of refuge at Duck Island. I believe that the breakwaters can be relocated so as to afford, in conjunction with the Kelseys Point breakwater, much better protection than if completed according to the present plan and built at a cost which will not greatly exceed the estimated amount required for the completion of the harbor under the present project; but the data available are insufficient to enable me to make a proper estimate of the cost. It is estimated that the cost of a survey to obtain the necessary data will be $350.

The section of Long Island Sound between New Haven and New London appears to be particularly dreaded by towboat captains on account of lack of harbors in which to seek shelter in case of storm, there being no harbor except Duck Island in this stretch that can safely be used and none that is available except for very light-draft boats. Forwarded herewith is a petition [a] signed by practically all of the towing interests of Long Island Sound and a large number of captains and pilots of towboats; also a number of letters [a] received from parties who are largely interested in this improvement.

In my opinion the locality is worthy of further improvement by the United States.

Very respectfully, your obedient servant,

HARRY TAYLOR,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

NORTHEAST DIVISION ENGINEER OFFICE,
New York, May 1, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army, concurring in the opinions and recommendations of the district engineer officer.

AMOS STICKNEY,
Colonel, Corps of Engineers,
Division Engineer.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., May 7, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

The Board has had before it the within report of the district officer and the accompanying communications on the subject of a preliminary examination of Duck Island harbor of refuge.

The existing project adopted in 1890 provides for the construc-
ree breakwaters having an aggregate length of 5,880 feet,
ated cost of $463,540. One hundred and sixteen thousand
lred and nine dollars and twenty-five cents has been

[a] Not printed.

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expended, resulting in the construction of 2,770 linear feet of the breakwater west of Duck Island of somewhat reduced cross section over that projected.

It appears that considerable benefit has resulted from this work, but that the protection afforded is inadequate for the present needs of commerce. The district officer expresses the opinion that the locality is worthy of further improvement and suggests that the breakwaters can be relocated so as to afford much better protection than if completed according to the present plan, and built at a cost which will not greatly exceed the estimated amount required for the completion of the present project. For the purpose of making a revised plan and estimate he recommends that a survey be made at an estimated cost of $350.

The commerce interested in this improvement is that passing through Long Island Sound and which during stress of weather must seek shelter. The amount of this commerce in tons can not be even approximately estimated, but the number of vessels is known to be large.

The Board believes that the facilities afforded by the work already done are inadequate and that these should be extended by the completion of the present plan or a modification thereof, and concurs with the district officer and the division engineer in recommending that a survey be authorized with a view to determining the best plan and its cost.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

[Fourth indorsement.]

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, May 11, 1907.

Respectfully submitted to the Secretary of War.

This is a report on preliminary examination of Duck Island harbor of refuge, Connecticut, authorized by the river and harbor act of March 2, 1907.

Inviting attention to the report of the Board of Engineers for Rivers and Harbors, in the preceding indorsement, I recommend that a survey of the locality, as proposed, be authorized.

FREDERIC V. ABBOT,
Acting Chief of Engineers.

[Fifth indorsement.]

WAR DEPARTMENT,
May 13, 1907.

Approved.

ROBERT SHAW OLIVER,
Assistant Secretary of War.

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SURVEY OF HARBOR OF REFUGE AT DUCK ISLAND, CONNECTICUT, AND IN CONNECTION THEREWITH FOR A BREAKWATER AT KELSEYS POINT.

ENGINEER OFFICE, UNITED STATES ARMY,
New London, Conn., October 29, 1907.

GENERAL: I have the honor to forward herewith map of Duck Island Harbor, Connecticut, made in compliance with your instructions of May 15, 1907, under authority of the act of Congress approved March 2, 1907, authorizing—

A further examination and survey for a harbor of refuge at Duck Island, and in connection therewith for a breakwater at Kelseys Point, Connecticut.

The general conditions at this locality and the reasons why a further improvement is desired were given in my report of a preliminary examination of this locality, submitted under date of April 29, 1907. The locations of the breakwaters authorized by the project adopted by the act of September 19, 1890, the profile[a] and cross sections[a] of the breakwater constructed under that project, and the location of the breakwaters now recommended are shown on the accompanying maps.

Of the breakwaters authorized by the project of 1890, only one has been commenced. This breakwater extends westerly from Duck Island a distance of 2,697 feet, being within 303 feet of its projected length of 3,000 feet. The project dimensions of this breakwater are 10 feet high above mean low water and 10 feet wide on top. The sheet of cross sections herewith shows that none of the breakwater has been completed to the project dimensions, its general average height being about 8½ feet above low water and its width on top about 8 feet. This part of the breakwater was constructed between the years 1891 and 1898, and in 1901 and 1905 some repairs were made. In general, the breakwater has withstood wave attacks very well, but in some places an evidence of the effect of the waves is shown at about low-water level. Such evidence as there is, however, indicates that if the breakwater had been built with a slope of 1 on 1½ on the outer side as projected it would probably have withstood wave attack without serious injury.

A study of the conditions existing at this locality indicates that the project of 1890 should be modified. The two breakwaters which are planned, one extending from Duck Island northeast and the other from Menunketesuck Point southwest, close a considerable portion of the channel between Duck Island and Menunketesuck Point, leaving an opening between the two breakwaters of only about 700 feet. At certain stages of the tide and in certain directions of winds a very strong tide sweeps through this harbor. Under these conditions it would be impracticable for sailing vessels to enter Duck Island Harbor through the opening between the two breakwaters, and extremely difficult, if not impossible, for the large Sound tows which would use this harbor were the shelter afforded by it sufficient for them to do so. There has been a very considerable filling to the north of the present breakwater, and if the channel between Duck Island and Menunketesuck Point were materially reduced the tidal velocity through the har-

[a] Not printed.

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bor would be reduced and possibly with the effect of rapidly shoaling the entire harbor. A breakwater located on the shoal extending northward from Duck Island will afford better protection to the portion of the harbor generally used for anchorage, will cost far less than the two breakwaters now planned, and will not interfere in any way with vessels entering or leaving the harbor, as no vessels would cross the shoal upon which this breakwater would be located.

The extension of the breakwater to the west of Duck Island to its project length is not advisable, as this would have a tendency to crowd vessels over toward the shoal water to the west, and with the strong tide this is undesirable.

A new breakwater located on Stone Island reef, south of Kelseys Point, is indicated on the map. This breakwater has a total length of 3,750 feet and affords very complete protection to winds coming from the southwest and considerable protection to winds from an easterly direction.

With the breakwaters relocated as indicated on the accompanying map, the protection in the harbor would be as follows:

In the two northerly quadrants complete protection is secured by the natural location of the harbor. With wind due east the breakwater to the north of Duck Island together with Menunketesuck Point would form a complete protection to the anchorage to the northward of the existing breakwater, and the Kelseys Point breakwater would also afford a considerable area available for anchorage purposes to the west of it and opposite the entrance to Clinton Harbor. Between south and southeast the Kelseys Point breakwater would afford little or no protection, but the protection afforded by the Duck Island breakwaters would be secure and would comprise about 130 acres of area where the low-water depth is 15 feet or more, being a space about 3,000 feet long and averaging 2,000 feet wide. This is the minimum amount of protection which would be afforded by this harbor of refuge.

With the wind from south to west, the sheltered area rapidly increases, so that when the wind is due southwest it amounts to about 400 acres (235 back of Kelseys Point breakwater and 165 back of Duck Island breakwater), and when it becomes SW. ¾ W. the protected area extends all the way from the Kelseys Point breakwater to the northward of Duck Island with a width of from one-quarter to one-half mile and comprises about 550 acres. As the wind swings more to the west the area protected by the Kelseys Point breakwater increases.

In the above, the sheltered area mentioned is in all cases that where the depth is 15 feet or more.

The protection that is most urgently needed at this locality is that from storms coming from the southwest, the wind in this direction having a sweep of about 30 miles diagonally across the Sound and there being no other harbor in this vicinity which affords shelter from storms from this direction. For this direction the locations of the breakwaters adopted by the project of 1890 afford very little protection, whereas a breakwater located south of Kelseys Point, as shown on the accompanying plan, would afford very complete protection to a large area.

Further investigation indicates that this improvement, especially the Kelseys Point breakwater, is one greatly desired by all interests

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navigating vessels on Long Island Sound, and, in fact, that it is more urgently needed than any other improvement on the coast of Connecticut, and its usefulness will be greater to the general navigation interests.

Since February 1, 1907, the keeper of the Duck Island light has been furnishing me with a daily report of vessels using this harbor for refuge, and these reports show that from February 1, to October 20, 1907, 770 vessels entered and anchored in this harbor. These were mostly schooners and tugs with tows of barges. During the summer considerable numbers of yachts used the harbor, but, as just stated, the main use of it has been for freight-carrying vessels.

The estimated cost of the project of 1890 is $463,540. Of this amount $114,000 has been appropriated for construction work, leaving $349,540 to be appropriated, and $6,202 has been appropriated or allotted for repair work.

It is estimated that in the revised locations the cost of the breakwaters will be as follows:

	Gross tons.	
Kelseys Point breakwater	226,480	
Breakwater northerly from Duck Island	20,675	
Completion of existing breakwater	16,200	
Total	263,355, at $1.20	$316,026
Administration, inspection, and contingencies		34,000
Total		350,026

or in round numbers $350,000, which is practically the same as the amount estimated to complete the existing project. The cost of maintenance of the breakwaters after completion should be very small, but as some displacement of the stones might occur an estimate of $5,000 once in ten years is submitted.

In the above estimates the breakwaters are estimated to be 8 feet wide on top, 9 feet high above mean low water, and with side slopes of 1 on 1½, except on the northerly side of the existing breakwater and the westerly side of the breakwater northerly from Duck Island, where the slopes would be 1 on 1, experience having demonstrated that for this locality these dimensions and slopes will be ample.

Very respectfully, your obedient servant,

HARRY TAYLOR,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers. U. S. A.
(Through the Division Engineer.)

[First indorsement.]

NORTHEAST DIVISION ENGINEER OFFICE,
New York, October 31, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army.

I deem the harbor of refuge at Duck Island worthy of improvement to the extent of constructing one breakwater at Kelseys Point and a second northerly from Duck Island, as recommended herein.

If this improvement be authorized the original project should be [illegible] to omit the two breakwaters between Duck Island and

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Menunketesuck Point, and to discontinue the extension westward of the existing breakwater, work on this latter being confined to reinforcing this breakwater in cross section.

JOHN G. D. KNIGHT,
Colonel, Corps of Engineers,
Division Engineer.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., November 4, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

In the within report on a survey of Duck Island harbor of refuge, in connection with which a breakwater at Kelseys Point is considered, the district officer proposes a modification of that part of the existing project which has not been completed. In lieu of the two projected breakwaters between Duck Island and Menunketesuck Point, he proposes one breakwater of 1,100 feet in length, to be located on a reef making northward from Duck Island. It is believed this will give better protection from easterly and southeasterly winds than the breakwaters provided for in the existing project, and will perhaps lessen the tendency to fill in the harbor and make it easier of entrance.

He proposes to provide protection from westerly and southwesterly winds and storms by the construction of a breakwater 3,750 feet in length, near Kelseys Point on a reef about 8,000 feet to the westward of the light on the end of the existing Duck Island breakwater, and to bring the existing breakwater to full cross-section dimensions, but to omit the construction of the 303 feet yet required to complete its full project length.

He estimates the cost of all the work proposed, including $34,000 for administration, inspection, and contingencies, at $350,000 in round numbers, which is practically the same amount estimated to complete the existing project. It is believed the modifications proposed will provide a more commodious and safer harbor of refuge, more accessible and better adapted for the use of the vessels which seek shelter here.

The Board believes the locality worthy of further improvement by the General Government to the extent proposed, and it concurs with the district officer and the division engineer in recommending the modification of the existing project as outlined within.

For the Board:

R. L. HOXIE,
Colonel, Corps of Engineers,
Senior Member Present.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 399.

COQUILLE RIVER, OREGON.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORTS OF EXAMINATION AND SURVEY OF COQUILLE RIVER, OREGON, AT AND NEAR ITS MOUTH.

DECEMBER 21, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed with accompanying illustrations.

WAR DEPARTMENT,
Washington, December 20, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated 18th instant, together with copies of reports from Lieut. Col. S. W. Roessler, Corps of Engineers, dated March 23 and October 11, 1907, of a preliminary examination and survey, respectively, of Coquille River, Oregon, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 18, 1907.

SIR: I have the honor to submit herewith for transmission to Congress reports of March 23, 1907, and October 11, 1907, with maps, by Lieut. Col. S. W. Roessler, Corps of Engineers, on preliminary examination and survey, respectively, authorized by the river and harbor act approved March 2, 1907, of Coquille River, Oregon, with a view to the removal of shoals and rocks at its mouth.

Coquille River is at present being improved under a project which provides for securing a permanent channel over the ocean bar by means of two converging jetties. The object of the present investigation is the removal of certain obstructions to a free use of the channel within the entrance.

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While the item of the act authorizing the examination specifies rocks and shoals at the mouth of the river, the investigation has been extended to include two shoals, one 2 miles and the other 7 miles above the mouth, the removal of which is very much desired by the shipping interests involved.

The cost of removing all the obstructions considered to a depth of 10 feet at mean lower low water is estimated at $27,840, with $4,000 annually for dredging to maintain the proposed channels across three shoals. If the Government dredge provided for the Oregon coast harbors should be available for this work, its cost would be less.

I concur in the opinion of the district officer and the Board of Engineers for Rivers and Harbors that Coquille River is worthy of improvement in the manner proposed.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF COQUILLE RIVER, OREGON, AT AND NEAR ITS MOUTH.

UNITED STATES ENGINEER OFFICE,
Portland, Oreg., March 23, 1907.

GENERAL: In compliance with instructions contained in letter from Office Chief of Engineers, dated March 14, 1907, I have the honor to submit the following report on the preliminary examination of "Coquille River, with a view to the removal of shoals and rocks at its mouth," as provided by the river and harbor act approved March 2, 1907:

The Coquille River empties into the Pacific Ocean at a point on the western coast of Oregon, about 375 miles north of San Francisco, Cal., and 16 miles south of the entrance to Coos Bay, Oregon. The mean lower low-water depth in the bar channel, as shown by the last survey made in 1905, is 9 feet. The average range of the tide at the bar is 4.2 feet. Vessels drawing about 11 feet can cross the bar at high tide and find little difficulty in ascending the stream at high tide to the town of Coquille, about 25 miles above the town of Bandon at its mouth. The river is navigable for light-draft river boats about 12 miles upstream from Coquille to the town of Myrtle Point.

The work of improving the bar at the mouth of the river by two rubblestone jetties has been in progress since 1881, and the project is nearly completed. This project, and the present status of the work, is described in the Annual Report of the Chief of Engineers for 1906, pages 732–734. The river and harbor act approved March 2, 1907, appropriated the sum of $60,000 to finish the north jetty and complete the project.

There are several dangerous submerged rocks in the entrance between the jetties; also a group of similar rocks in the channel in front of the town of Bandon. One of the rocks near the south jetty has been approximately measured and found to be about 120 feet long by 50 feet wide, its top being not more than 2 feet below the plane of mean lower low tide. A sandy shoal just above Bandon, a short distance from the entrance, on which the controlling depth is about 5 feet at low tide, obstructs the low-water navigation of the river.

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The river and ocean form the only practicable means of transporting most of the commerce. A railroad owned by the Southern Pacific Railway Company connects the towns of Coquille and Myrtle Point, on the upper river, with Marshfield, on Coos Bay, but the combined rates of rail and ocean via Marshfield considerably exceed the water rate direct from the Coquille. The principal articles of export are lumber, coal, live stock, and farm produce.

The commerce is carried on in small coasting steamers and schooners, which ply between the various mills along the 25 miles of the river above its mouth and San Francisco. The vessels carry into the port chiefly mill and farm machinery and miscellaneous supplies. The Coquille Valley has great undeveloped resources, and the commerce of the port has more than trebled in the last ten years, as may be seen by the following comparative statement of traffic:

Calendar year.	Tons.	Estimated value.
1896	21,106	.....
1897	25,620	.....
1898	24,550	.....
1899	26,654	.....
1900	30,727	.....
1901	32,975	.....
1902	37,458	.....
1903	48,249	.....
1904	60,944	$1,332,058.00
1905	45,455	1,105,750.00
1906	67,288	1,119,716.00

The following commerce was carried by vessels across the bar at the mouth of the Coquille River during the calendar year 1906:

Article.	Estimated value per ton.	Tons inbound	Tons outbound.	Value inbound.	Value outbound.
Broom handles	$15	.....	159	.....	$2,385
Grain	20	45	234	$900	4,680
Hay	13	45	.....	585	.....
Lumber	10	.....	55,926	.....	559,000
Matchwood	6	.....	4,201	.....	25,206
Miscellaneous	100	3,810	856	381,000	85,600
Shingles	30	.....	2,012	.....	60,360
Total	.....	3,900	63,388	382,485	737,231

Total tonnage, 67,288; total value, $1,119,716.
Number of passengers arrived by sea, 111; departed by sea, 95; total, 206.

List of vessels crossing the bar at entrance to Coquille River, Oregon, during the year ending December 31, 1906.

	Net tonnage.
Advance	171.0
Albion	75.0
Antelope	117.0
Bender Brothers	80.0
Berwick	95.0
Bessie K	93.0
Chico	396.0
Chinook	771.0
Coquille	97.0
Coquille River	265.0
C. T. Hill	133.0
Elizabeth	284.0
Geo. R. Vosburg	66.0
Hugh Hogan	355.0
Lizzie Prien	91.0
Mayflower	86.0
Oakland	383.0
Oregon	304.0
Raymond	471.0
Rita Newman	120.0
Ruby	306.0
San Buena Ventura	171.0
Sotoyome	394.0
Traveller	72.0
Triumph	27.3

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The position and extent of the submerged rocks and shoals at the mouth of the Coquille River is not known with sufficient accuracy to enable a reliable estimate of the cost of their removal to be made.

In my opinion, the importance of the growing commerce and the fact that the General Government has improved the ocean bar make the entrance and river worthy of improvement by the General Government to the extent of blasting out the dangerous rocks, and dredging the shoals so that vessels which can safely cross the bar can proceed unimpeded up the river to the shipping points above Bandon.

It is worthy of mention in this connection that an appropriation has been made in the act approved March 2, 1907, for a coast dredge which may be used at Coquille River as well as at other coast harbors.

In addition to the shoal mentioned near the mouth, there exist two other shoals with about the same depth on them—one near Randolph, about 2 miles above Bandon, and one near Parkersburg, about 7 miles above Bandon. Although an examination of these two latter shoals is not called for in the act, not being at the mouth of the river, I have nevertheless made mention of them in this report, as their removal is very much desired by the shipping interests of the river. All of these shoals have become more troublesome to the increasing commerce of late years, vessels which load at the mills above being frequently delayed and lighterage resorted to in many cases.

I would therefore recommend that a survey be made of the entrance to the Coquille River, Oregon, and that it include the shoals near Randolph and Parkersburg. It is estimated that the sum of $800 will be required for this purpose.

Very respectfully, your obedient servant,

S. W. ROESSLER,
Lieut. Col., Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., May 27, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

The project adopted in 1880 for improving the entrance to Coquille River has been modified from time to time and now provides for securing a depth of 8 feet across the bar at mean low water by the construction of two jetties. The total amount expended to June 30, 1906, was $282,020.65, and it is expected that the work will be completed by the expenditure of $60,000 appropriated by the act of March 2, 1907.

The last survey made in connection with the improvement shows a depth of 9 feet in the bar channel at mean lower low water, but several rock obstructions lying between the jetties and at other points above make the passage dangerous for the class of vessels now navigating this river and prevent the full realization of the benefits which would otherwise be derived from the improvement. The present inquiry has in view the removal of these rock obstructions, and the district officer believes this is a work worthy of being undertaken by the United States and recommends a survey at a cost

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of $800 to enable a reliable estimate of the cost of their removal to be made. He recommends that in addition to the obstructions directly at the mouth, the survey include a shoal near Randolph, about 2 miles above Bandon, and one near Parkersburg, about 7 miles above Bandon, but calls attention to the fact that an examination of these obstructions is not ordered by the act.

The necessity for the removal of these obstructions and of a large rock at the mouth is explained in the Annual Reports of the Chief of Engineers for 1906 and other recent years, and it seems not improbable that the act ordering this examination had in view the work therein mentioned. It is evident that the removal of these shoals would be of material advantage to commerce, and in the opinion of the Board this is advisable if it can properly be done under the law and at reasonable cost, as these obstructions affect the same traffic as those directly at the mouth.

The commerce of the river shows a steady growth in recent years, and the Board is of the opinion that its present and prospective development will be augmented by the removal of obstructions which render transportation dangerous and prevent the full utilization of existing facilities.

In view of the above the Board concurs in the recommendation of the district officer that a survey be made of the rocks and shoals at the mouth of the river, and that this survey include the obstructions referred to above if in the opinion of the Department these can properly be considered in connection with the present examination.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

[Fourth indorsement.]

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, May 28, 1907.

Respectfully submitted to the Secretary of War.

This is a report on preliminary examination of Coquille River, Oreg., with a view to the removal of shoals and rocks at its mouth authorized by the river and harbor act of March 2, 1907.

Inviting attention to the report of the Board of Engineers for Rivers and Harbors, in the preceding indorsement, I recommend that a survey of the locality as proposed be authorized.

It is believed that all the obstructions to navigation contemplated in this report may properly be included within the survey to be authorized.

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

[Fifth indorsement.]

WAR DEPARTMENT,
May 28, 1907.

Approved as recommended by the Chief of Engineers.

ROBERT SHAW OLIVER,
Assistant Secretary of War.

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SURVEY OF COQUILLE RIVER, OREGON, AT AND NEAR ITS MOUTH.

UNITED STATES ENGINEER OFFICE,
Portland, Oreg., October 11, 1907.

GENERAL: The preliminary report of "Coquille River, with a view to the removal of shoals and rocks at its mouth," called for by the river and harbor act of March 2, 1907, was submitted on March 23, 1907, and a survey was recommended and authorized. The survey has been completed, and the following report thereon is respectfully submitted:

The improvements heretofore made and the present commerce of the river are fully described in the preliminary report.

The survey included the entrance proper and three shoals above the entrance. The results are platted on the two tracings herewith. For the bar work the United States Life-Saving Department courteously gave us the use of their lifeboat and crew, and their excellent service is hereby acknowledged. The remainder of the survey was mostly done with a small boat and tag line.

The least depth on the bar was found to be 10 feet at mean lower low tide, and this was located just inside the outer ends of the jetties. The mean range in tide is 5.3 feet above mean lower low water, giving 15.3 feet at average high tide. The maximum draft of vessels now crossing the bar is 12 feet. Vessels of this draft can ascend the river at high tide a distance of 25 miles to Coquille.

No further extension of the jetties beyond that heretofore authorized is contemplated. The improvements desired are within and above the entrance, and these consist in the removal of submerged rocks near the entrance in the vicinity of Bandon, which are a menace to vessels, and the deepening of three shoals above Bandon. Taken in order they are as follows:

Submerged rock "A."—A small pinnacle rock discovered last year right in the middle of the present ship channel between the jetties. It is very dangerous and should be blasted out to a depth of 10 feet at mean lower low water.

Submerged rock "B."—This is a ledge about 50 feet wide extending 180 feet out from the south jetty near its inner end. This rock was mentioned in the Annual Report of the Chief of Engineers for 1903, page 2207. An attempt was made to remove it in 1900, but it proved to be a greater undertaking than the available funds would permit, and its removal was not effected. If the northerly point of it is taken off and marked by a beacon and a spur jetty built out over it so as to cause the channel to shift farther northward, the rock would cease to be a serious menace. This work is recommended.

Submerged rocks "C," "D," and "E."—These are located in the channel just above Bandon, between the woolen mill dock and Cody's mill. Rock "C" is exposed at low water. Rock "D" has a depth of 5 feet, and rock "E" a depth of 1½ feet at mean low water. Their removal is desirable, and the cost of removal is small.

Shoal just above Bandon.—This is a sandy shoal with a controlling depth of a little less than 6 feet at mean lower low tide. Measured along the channel it is 4,100 feet long between the 10-foot contours. Nearly all the outgoing freight leaving the harbor is collected above this shoal, and fully loaded vessels have to wait until the top of high water to cross it, which often prevents them from going directly to sea on that tide. The work proposed is to dredge a channel 140 fee

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wide and 10 feet deep at mean lower low water along the line shown on chart. The quantity of material to be removed is estimated at 75,000 cubic yards.

Randolph and Parkersburg shoals.—These are two shoals in the channel above Bandon which impede navigation to some extent. They have a controlling depth of about 6 feet over them at mean lower low tide, and although only a part of the seagoing freight is collected above them, it is thought desirable to dredge them to a depth of 10 feet for a width of 100 feet. Such channels would require the removal of about 11,000 cubic yards from Randolph shoal and 26,000 cubic yards from Parkersburg shoal. The material to be moved is sand and silt. It is not likely that frequent dredging would be required to maintain these channels. The additional expense of deepening these shoals would be small if a dredging plant were brought to the river to remove the Bandon shoal.

The estimate of cost is as follows:

The removal of the small channel rock "A"	$800
The blasting off of 20 feet of the north point of the large channel rock "B"	800
The removal of the exposed rock near the woolen mill, "C"	1,000
The removal of small rock "D"	600
The removal of the large rock nearer to Cody's mill, "E"	1,200
The building of small spur jetty to and on large channel rock about 150 feet long	2,000
Dredging of shoal immediately above Bandon (removal of about 75,000 cubic yards, at 15 cents)	11,250
The dredging of Randolph shoal (11,000 cubic yards, at 15 cents)	1,650
The dredging of Parkersburg shoal (26,000 cubic yards, at 15 cents)	3,900
	23,200
Engineering, contingencies, and office expenses, 20 per cent	4,640
Total	27,840

It is estimated that the sum of $4,000 would be required annually for dredging to maintain the proposed channels across the three shoals. In view of the growing commerce of the river, the work herein proposed, which logically follows the improvement already made in the depth of the bar at the entrance, is deemed worthy of execution by the United States.

The estimate for the dredging is based on the supposition that private dredges would probably have to be employed. If the coast dredge already appropriated for, and soon to be advertised, should be available, the cost per cubic yard would be less than that given in the estimate; but in view of the pressure for dredging in more important harbors, as Coos Bay, it is doubtful if the Government dredge could become available for Coquille River for several years, and that private dredges would have to be depended on for early prosecution of of the work.

Very respectfully, your obedient servant,

S. W. ROESSLER,
Lieut. Col., Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.

[Second indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., October 28, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

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The survey of Coquille River indicates that the obstructions to be removed, to provide suitable navigation, consist of five submerged rocks at and near the mouth of the river, and three shoals above.

The district officer estimates that the work contemplated will cost $27,840, and that future maintenance will amount to $4,000 annually. He expresses the opinion that the improvement is worthy of this expenditure.

A large sum has already been expended on this improvement and the results have been satisfactory. A commerce of considerable size and value has developed and is increasing. The rocks and shoals referred to endanger this commerce and prevent the full benefits of the improvements already made being realized.

In the opinion of the Board, the cost of the work now proposed is reasonable when compared with the additional advantages that will probably result therefrom, and it believes it is desirable that the United States undertake the work.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 400.

RED RIVER OF THE NORTH, MINNESOTA AND NORTH DAKOTA.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF RED RIVER OF THE NORTH, MINNESOTA AND NORTH DAKOTA.

DECEMBER 21, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 20, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated 19th instant, together with copy of a report from Maj. Francis R. Shunk, Corps of Engineers, dated November 13, 1907, of a preliminary examination of Red River of the North, Minnesota and North Dakota, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 19, 1907.

SIR: I have the honor to submit herewith for transmission to Congress report of November 13, 1907, by Maj. Francis R. Shunk, Corps of Engineers, on preliminary examination authorized by the river and harbor act approved March 2, 1907, of Red River of the North, Minnesota and North Dakota, with a view to straightening and deepening the channel.

Work is now in progress on Red River of the North under a project which provides for improving the natural channel of the stream.

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From the facts and for the reasons given, I concur in the opinion expressed by the district officer, the division engineer, and the Board of Engineers for Rivers and Harbors that the river is not worthy of improvement in the manner contemplated by the item of law ordering this examination.

Very respectfully, A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF RED RIVER OF THE NORTH, MINNESOTA AND NORTH DAKOTA.

UNITED STATES ENGINEER OFFICE,
St. Paul, Minn., November 13, 1907.

GENERAL: 1. In compliance with Department letter of March 14, 1907, I have the honor to submit report upon an examination of the Red River of the North with a view of straightening and deepening the channel.

2. Previous examinations of this river have been made as follows:

Survey from Moorhead to Frog Point in 1873. (Report, Chief of Engineers, 1873, p. 51; (Report, Chief of Engineers, 1874, pp. 58, 295.)

Survey from Moorhead to Breckenridge in 1874. (Report, Chief of Engineers, 1875, p. 370.)

Examination between Frog Point and boundary line in 1877. (Report, Chief of Engineers, 1878, p. 730.)

Examination between Fargo and Breckenridge in 1880. (Report, Chief of Engineers, 1881, p. 1828.)

Examination from Moorhead to Fergus Falls in 1886. (Report, Chief of Engineers, 1887, p. 1733; (Report, Chief of Engineers, 1888, p. 1586.)

Examination of Red Lake River, etc. (Report, Chief of Engineers, 1900, p. 2830.)

Examination of Red River and tributaries, etc. (Report, Chief of Engineers, 1904, p. 2262.)

3. The Red River is now being improved by the United States under a project adopted in 1879. This project contemplates an open channel from Breckenridge to the Canadian frontier, a distance by water of 395.5 miles, as follows:

(*a*) Breckenridge to Moorhead (97 miles), a channel capable of being navigated during high and medium stages of water.

(*b*) Moorhead to Grand Forks (155 miles), a channel 50 feet wide and 3 feet deep at low water.

(*c*) Grand Forks to the northern boundary line (143.5 miles), a channel 60 feet wide and 4 feet deep at low water.

4. Up to this time the object of the improvement has not been attained on the first division of the river, which has for some years been closed against all navigation by highway bridges. The desired results were obtained some years ago on all but 13 miles of the second division; but owing to lack of funds, which has prevented sufficient dredging being done to maintain the improvement, the navigable depth on this division is now only about 2 feet, and the upper portion is also closed against all navigation by highway bridges. On the third division the object of the improvement was achieved in 1902, but as the bars are constantly re-forming in the river, work has been done since 1902 in maintenance of the channel to the width and depth above mentioned, between Bellmont and Pembina.

5. Navigation on the Red River is at present confined to the section of river last mentioned. In 1906 the traffic on the river was as

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follows: Two steamboats, 25 and 100 tons burden and about 30 inches draft, with fleet of 12 barges, ran from Grand Forks to points north and south. Total freight carried, 13,965 tons, mainly wheat in bulk.

6. The present examination was made by Mr. R. Davenport, assistant engineer, in July, 1907. Maps and records of this office have also been consulted.

7. The Red River of the North, from Breckenridge to the Canadian frontier, is very crooked, its length being about 395.5 miles, while the direct distance is 191 miles. It has been considered in three sections.

8. From Breckenridge to Moorhead the distance by river is 97 miles, the direct distance 44 miles. By cutting through bends the distance by river may be reduced to 52 miles. The total length of the required cuts would be 15¾ miles; their average depth 25 feet; the average width at top, allowing slopes of 1 on 3, 160 feet. The average width of the strip of land required for channel and spoil bank would be 240 feet.

9. From Moorhead to Grand Forks the direct distance is 73 miles. The distance by river is 155 miles. This distance may be reduced by cutting through bends to 92 miles. The total length of the required cuts would be 22.4 miles. The average depth required would be 45 feet; the average width, allowing slopes of 1 on 3, 270 feet. The average width of the strip of land required for channel and spoil bank would be 780 feet.

10. From Grand Forks to Pembina the direct distance is 74 miles. The distance by river is 143.5 miles. By cutting through bends the distance by river may be reduced to 91 miles. The total length of the required cuts would be 27 miles; their average depth would be 40 feet; the average width at top, allowing slopes of 1 on 3, would be 305 feet. The average width of the strip of land required for channel and spoil bank would be 820 feet.

11. The above figures are approximate only, but it is my opinion that the examination was sufficiently detailed to make it improbable that a reduction of more than 25 per cent could be made.

12. The total excavation required for straightening the channel is about 113,528,800 cubic yards. The total land area required for the channel cuts and spoil banks is about 5,651 acres. In addition to this, as a number of peninsulas would be rendered inaccessible by the proposed straightening, it is probable that a large amount of money would have to be expended in satisfaction of damages or acquisition of such points of land. The aggregate area of the peninsulas which would be so cut off is about 13,894 acres.

13. It therefore appears that the work of straightening the channel of the Red River of the North would be one of great magnitude. The straightening of the channel is not desired, by those interested in the project, to benefit navigation, and it would, in fact, be very detrimental to navigation, as the slope of the river would be greatly increased and the low-water depths, which are already small, would be greatly diminished, so that navigation would probably become impossible. The object of the proposed work is to afford easier escape to flood water and so diminish the height of the annual floods and the area of land which they affect.

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14. In order to reconcile the proposed scheme to the interests of navigation, it would be necessary to fix the bottoms of the proposed cuts at about 5 feet above the bottom of the river. This would make it possible to continue navigation in the present channel at low-water stages; but it is probable that some means would have to be taken to prevent deepening of the artificial cuts by scour, and such means, bottom sills or revetment, would greatly increase the expense of the work.

15. It must also be remembered that the Red River crosses the frontier and enters Canadian territory. Unless the work of straightening were continued beyond the frontier, the effect would be merely to accumulate water near the present boundary, and probably to increase the floods in this portion of the river, both in the United States and in Canada. Such a plan would certainly be objected to.

16. The flood conditions of the Red River are greatly aggravated by the fact that the river flows toward the north, and consequently melting first takes place in the upper part. Ice jams immediately result, and a wide area of territory is flooded. If this were not the case, I estimate that at high water the slope in the first section, from Breckenridge to Moorhead, would be increased from 0.68 to 1.18 feet per mile. In the second section, from Moorhead to Grand Forks, the slope would be increased from 0.475 of a foot to 0.775 of a foot. In the third section, from Grand Forks to Pembina, the slope would be increased from 0.268 to 0.427 of a foot per mile. An approximate computation shows that in the absence of ice jams the average flowage velocity would increase from 4.15 feet per second to 5.3 feet per second, or about 27.5 per cent, and that this increase of velocity would probably reduce the height of flood stages and likewise lessen their duration, but as things are I do not think that the diminution of floods would be appreciable.

17. In addition to straightening, it is desired by those interested in the river to deepen the channel in order to provide a more capacious outlet for flood water. This would be accomplished by lowering the present bed of the river about 10 feet, which I estimate to be the least increase of depth that could have a valuable effect. Such deepening could not be continued indefinitely toward the mouth of the river, but would have to diminish to zero before reaching the Canadian frontier. The effect would be to diminish the total fall of the river bed by 10 feet, and proportionately to decrease the velocity of the discharge.

18. In view of the fact that the floods are largely due to the ice jams, I doubt very much if the proposed deepening would have any beneficial effect at all.

19. Flood conditions along the Red River of the North are undoubtedly serious. The area flooded at extreme high water in 1897 is estimated at 1,650 square miles. If the floods could be diminished and arable lands protected at any reasonable cost, work to this end should certainly be undertaken, but I do not think that relief can be obtained by straightening the bends and deepening the channel as proposed, which work would not only be enormously expensive, but would involve the cooperation of the Canadian government, might not be compatible with the interests of navigation, and would probably not be of much use.

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20. For the above reasons I am of opinion that the work of straightening and deepening the channel of the Red River of the North ought not to be undertaken by the United States.

Very respectfully, your obedient servant,

FRANCIS R. SHUNK,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

OFFICE DIVISION ENGINEER, NORTHWEST DIVISION,
Chicago, Ill., November 14, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army.

I concur in the opinion of the district engineer as given by him in paragraph 20 of the report.

W. H. BIXBY,
Lieut. Col., Corps of Engineers,
Division Engineer, Northwest Division.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., December 9, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

This examination of Red River of the North is called for "with a view to straightening and deepening the channel." The channel is naturally very crooked, the distance from Breckenridge to the Canadian frontier, the part included in the existing project of improvement, being about 395.5 miles by river and 191 miles in a direct line. The existing project, which is described within, has never been completed in full, but the proposed dimensions were at one time obtained on the lower (northern) section, and also on the middle section, except for about 13 miles. Appropriations, however, have not been large enough to maintain these dimensions.

The commerce on this river is not large, the average for the past five years having been 20,810 tons, while for 1906 it was 13,965 tons, and it is stated that navigation is confined to a comparatively short section of river in the vicinity of Grand Forks. If a channel of the projected dimensions were secured and maintained, it would, in the opinion of the Board, provide adequate facilities for the character of boats on this river and for the handling of a much larger commerce than now exists.

The object of the proposed improvement is therefore not in the interests of navigation, but, as stated within, its purpose is to afford easier escape for flood water and so diminish the height of the annual floods and the area of land which they affect. The district officer refers to a plan for "straightening" the river by cutting off the bends, which is probably the character of work contemplated by those interested in securing the provision for the examination. It appears that the amount of work involved in this scheme is enormous, the excavation being more than 113,000,000 cubic yards. This plan would perhaps result in a quicker run-off of water during time of flood

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(unless it was held back by ice gorges, which are of frequent occurrence) and a moderate lowering of flood heights; but it would also materially increase the slope of the river and decrease its low-water discharge and its low-water depth, thereby injuriously affecting navigation. The plan would also require the right of way for the cuts, amounting to some 5,651 acres, and perhaps lessen the value of the lands cut off, the aggregate area of which is estimated at 13,894 acres.

The district officer also refers to a plan for "deepening" the channel by lowering the present river bed about 10 feet, which he deems the least increase of depth that would have a beneficial effect in flood control. This work would also involve a great amount of excavation, and as the principal cause of the floods is the ice jams it is not certain that such deepening of the channel would have any beneficial effect.

In view of all these facts the Board has arrived at the conclusion, concurring with the district officer and the division engineer, that the work of straightening and deepening the channel of the Red River of the North beyond that contemplated in the existing project is not advisable.

No communications have been received by the Board from those invited to submit their views in regard to the necessity for this improvement.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 401.

WHITE OAK RIVER, NORTH CAROLINA.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF WHITE OAK RIVER, NORTH CAROLINA, FROM ITS MOUTH TO MAYSVILLE.

DECEMBER 21, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 20, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated December 19, 1907, together with copy of a report from Capt. Earl I. Brown, Corps of Engineers, dated August 22, 1907, of a preliminary examination of White Oak River, North Carolina, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 19, 1907.

SIR: I have the honor to submit herewith for transmission to Congress report of August 22, 1907, by Capt. Earl I. Brown, Corps of Engineers, on preliminary examination authorized by the river and harbor act approved March 2, 1907, of White Oak River, North Carolina, with a view to obtaining 5 feet from its mouth to Maysville.

From the facts and for the reasons given I concur in the opinion of the district officer, the division engineer, and the Board of Engineers

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for Rivers and Harbors that this locality is not worthy of improvement by the United States in the manner proposed.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF WHITE OAK RIVER, NORTH CAROLINA, FROM ITS MOUTH TO MAYSVILLE.

WAR DEPARTMENT,
UNITED STATES ENGINEER OFFICE,
Wilmington, N. C., August 22, 1907.

GENERAL: I have the honor to submit the following report of a preliminary examination of White Oak River, North Carolina, made pursuant to the following provision of the river and harbor act of March 2, 1907:

White Oak River, with a view to obtaining five feet from its mouth to Maysville.

The duty of making this preliminary examination was assigned to the officer in charge of this office March 14, 1907.

This stream has its source in the low, flat swamps of Jones and Onslow counties, and is the line of division between Jones and Carteret counties on the east and Onslow County on the west, and has an outlet to the Atlantic Ocean through Bogue Inlet.

Maysville is a town of 300 to 400 inhabitants, on the Atlantic Coast Line Railroad, and is about 1 mile from the river. From the county bridge near Maysville to the outlet, as the stream meanders, is approximately 32 miles, but only about 18 miles in an air line.

The lower 22 miles of this stream was examined by Mr. F. D. Perry, overseer, on March 23, 1907, who ascended the stream in a naphtha launch drawing 2.5 feet to this point, where further progress was barred by fallen trees obstructing the stream. The portion of the stream between this point and the county bridge near Maysville, about 10 miles in length, was examined by Assistant Engineer R. C. Merritt on August 16, 1907.

Its entrance into the ocean is obstructed by a bar of shifting sand, which has at present a low-water depth of from 10 to 12 feet, but just inside of the bar proper there is a shoal on which there is now about 8 feet at low water, but these depths are not stable for any considerable length of time, varying to as little as 5 or 6 feet during some seasons.

From the inlet to Swansboro, a distance of about 5 miles, the channel is through marshes and is badly obstructed by numerous shoals of shifting sand, the governing low-water depth being about 3½ feet. The next 5 miles of river above Swansboro is very broad, ranging in width from about 1 to 2 miles, interspersed with many flats and oyster rocks, through which there is a narrow, tortuous, and shallow channel, the governing low-water depth being about 2 feet. Beyond this point to the town of Stella, a small village of about 60 to 75 inhabitants, 13 miles from the mouth, the river runs through marshes, and is about 300 feet wide, and the low-water depth varies

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from about 2½ to about 10 feet. From Stella, 9 miles up, the stream varies in width from 100 to about 200 feet, and not less than 5 feet at low water was found over this portion of the stream. From this point about 3 miles up the width varies from 40 to 90 feet, and there are but few places where the low-water depth is not less than 5 feet, but the river is crooked and obstructed by logs, snags, and trees. From this point to the county bridge near Maysville, a distance of about 7 miles, the stream varies in width from about 25 to 70 feet, and in depth from 2 to 9 feet, and is very crooked and badly obstructed by fallen trees, overhanging trees, logs, snags, and sand bars. At present it is not possible to navigate this 7 miles with a small skiff, and it was necessary for the party making this examination to haul its boat over as many as 35 logs and trees in this distance.

The greater portion of the lower 17 miles runs through low marshes, and the greater portion of the remaining 15 miles up to Maysville runs through low swamps. The effect of the tide is reported to be felt within 12 miles of Maysville at low stages. The river is subject to freshets of about 8 feet at Maysville. This stream is crossed by four bridges, as follows: The county bridge, near Maysville; the railroad bridge, near Maysville; the Sabiston bridge, about 5 miles below Maysville, and a county bridge at Stella. The three upper bridges are without draws. The lower bridge has a draw with a 25-foot opening.

A boat drawing about 4 feet of water has towed logs from a point about 20 miles from the mouth, but, as far as I know, there has never been any steamboat navigation above that point.

The stream was twice reported as unworthy of improvement by Capt. J. Mercur. (See Reports of Chief of Engineers, 1882, p. 1113, and 1884, p. 1055.)

In Report of Chief of Engineers for 1889, on page 1127, is to be found a very elaborate report and detailed estimate for the improvement of the stream, with favorable recommendation by Capt. W. H. Bixby, at an estimated cost of $45,000. The estimated value of its commerce at that time was $426,200. (See also Report of the Chief of Engineers for 1891, p. 1434.) Conditions are not thought to have materially changed since former reports, except that the upper portion is probably more obstructed and prospects for the future growth of its commerce lessened.

Adjacent to the stream, especially in its upper part, are many acres of fertile agricultural land, largely unimproved, and the future commerce will be mostly the products of these lands, since a majority of the timber contiguous to the stream has been purchased by large mill owners and much of it has been removed, and the greater portion of that which remains will probably be removed by railroads, as a road is being built from Swansboro for that purpose now. The turpentine forests are practically exhausted.

There is one large sawmill at Swansboro, and a small sawmill, gristmill and cotton gin combined at Stella.

The following is the approximate amount and value of the commerce carried over the stream during the calendar year ending December 31, 1906:

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Commodity.	Tons.	Price.	Value.
Cotton	62	$210	$13,020
Cotton seed	60	20	1,200
Eggs	1	300	300
Grain	9	35	315
Hay	50	20	1,000
Potatoes	30	20	600
Hogs	20	100	2,000
Fish	100	60	6,000
Oysters	16	25	400
Clams	200	25	5,000
Rosin	100	25	2,500
Turpentine, spirits	50	145	7,250
Wood	100	3	300
Timber	10,000	6	60,000
Lumber	9,000	10	90,000
Fertilizers	100	22	2,200
Machinery	100	100	10,000
General merchandise	1,500	140	210,000
Peanuts	14	60	840
Oil	20	35	700
Total	21,532	.....	413,625

At present about four small sailing craft, drawing from two to four feet of water, navigate the stream as far up as Stella. The only commerce above Stella is timber in rafts, which are towed to Swansboro. The lumber from the mill at Swansboro is loaded on flats and taken to vessels anchored near Bogue Inlet, when vessels drawing as much as 9 feet can cross Bogue bar, and at other times the lumber is taken to vessels at Beaufort Harbor. They propose shipping this lumber by rail as soon as their tramroad is completed. There is little or no lumber shipped from the mill at Stella.

Since the commerce of this stream is practically confined to its lower reaches, and no prospect is apparent for an increase in case improvement should be made, White Oak River is, in my opinion, not worthy of improvement by the General Government to the extent of obtaining 5 feet from its mouth to Maysville.

Respectfully submitted.

EARL I. BROWN,
Captain, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

OFFICE OF DIVISION ENGINEER, SOUTHEAST DIVISION,
Savannah, Ga., August 24, 1907.

Respectfully submitted to the Chief of Engineers, U. S. Army.

I agree with the district officer that White Oak River, North Carolina, is not worthy of improvement by the United States at this time.

DAN C. KINGMAN,
Lieut. Col., Corps of Engineers,
Division Engineer, Southeast Division.

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[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., December 9, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

The preliminary examination reported upon within has in view the improvement of White Oak River, North Carolina, to obtain a depth of 5 feet from its mouth to Maysville, a town of 300 to 400 inhabitants, situated about one mile from the river and 32 miles above its mouth.

From the description of the physical characteristics of the stream presented by the district officer, it appears that a depth exceeding that specified in the act exists at the ocean entrance to the river, but from the inlet up to Maysville numerous shoals exist and the upper reaches are crooked and badly obstructed by fallen trees, overhanging trees, logs, and snags, as well as by fixed bridges.

The cost of improving the stream was estimated in 1889, but the information afforded by the present examination indicates that the condition of the river is less favorable for improvement at reasonable cost than at the time of the earlier investigation. Its commerce during 1906 amounted to 21,532 tons, valued at $413,625, of which 19,000 tons consisted of timber and lumber. The only commerce above Stella, which is situated 13 miles from the mouth, is the ratting of timber. Lumber from a mill at Swansboro, 5 miles above the mouth, is now loaded on flats and taken to vessels at Bogue Inlet or Beaufort Harbor, but it is stated that this lumber will go by rail when a road now under construction has been completed. Exclusive of the timber and lumber shipments, the commerce now amounts to only 2,532 tons, confined to a stretch 13 miles in length immediately above the mouth. For this reason the necessity for providing a channel 5 feet deep for a distance of 32 miles to Maysville is not apparent to the Board, and it therefore concurs with the district officer and the division engineer in the opinion that it is not advisable for the United States to undertake the improvement specified in the act ordering this examination.

In response to invitations extended by the district officer to interested parties, with a view to securing all available information, Hon. C. R. Thomas, M. C., appeared before the Board at its session of this date in behalf of the interests concerned.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 402.

GALVESTON HARBOR-TEXAS CITY CHANNEL, TEXAS.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION, WITH PLAN AND ESTIMATE OF COST OF IMPROVEMENT, OF CHANNEL FROM GALVESTON HARBOR TO TEXAS CITY, TEX.

DECEMBER 21, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed, with illustration.

WAR DEPARTMENT,
Washington, December 19, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated 17th instant, together with copies of reports from Maj. Edgar Jadwin and Capt. John C. Oakes, Corps of Engineers, dated June 8 and September 7, 1907, of a preliminary examination, with plan and estimate of cost of improvement, respectively, of Texas City channel, Texas, made by them in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 17, 1907.

SIR: I have the honor to submit herewith for transmission to Congress reports of June 8, 1907, by Maj. Edgar Jadwin, Corps of Engineers, and September 7, 1907, with map, by Capt. John C. Oakes,

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Corps of Engineers, upon preliminary examination with plan and estimate of cost of improvement, respectively, authorized by the river and harbor act approved March 2, 1907, of Texas City channel, Texas, with a view to obtaining a channel 200 feet wide and 26 feet deep.

Under authority of the river and harbor act of March 3, 1899, a channel 100 feet wide and 25 feet deep was dredged to Texas City. This channel shoaled subsequently, and the act of March 2, 1907, carried an appropriation of $60,000 for maintenance of the improvement. It appearing as a result of the examination that further information as to the expense involved in obtaining the increased channel dimensions now contemplated, and of maintaining the project so increased, was essential to a final determination of the advisability of undertaking the further improvement, the preparation of an estimate of the cost of such improvement was ordered as provided by law.

The report of September 7, 1907, by Captain Oakes contains various estimates for securing and maintaining increased dimensions in the Texas City channel by dredging, with and without the aid of restraining dikes. In concluding the report Captain Oakes expresses the opinion that the present commerce of Texas City does not warrant the expenditure necessary to widen, deepen, and maintain the channel beyond the dimensions provided for by the present project, and that the improvement of this channel should be taken up in connection with the broad plans for the improvement of Galveston Harbor as a whole. However, as certain dikes mentioned by him would give considerable relief and reduce the annual cost of maintenance, he recommends their construction at an estimated cost of $40,000.

In forwarding this report, September 9, 1907, the division engineer, Col. E. H. Ruffner, Corps of Engineers, recommends that a channel 200 feet wide and 26 feet deep be provided at a first cost, including dikes, of $231,000, with $50,000 annually for maintenance after completion.

The reports have been referred, as required by law, for consideration by the Board of Engineers for Rivers and Harbors, and attention is respectfully invited to the Board's final report of November 25, 1907, herewith. In view of the facts presented the Board, practically agreeing with the local officer, reaches the conclusion that it is not advisable at the present time for the United States to undertake the extension of the improvement of Texas City channel "with a view to obtaining a channel 200 feet wide and 26 feet deep;" that the construction of dikes, as proposed by the district officer, at an estimated cost of $40,000 is advisable, if an effort is to be made to preserve the existing channel; and that the consideration of further provision for the commerce of Texas City should be postponed until it is brought up in the future in connection with broad plans for the development of Galveston Harbor.

I concur in the views of the Board of Engineers for Rivers and Harbors.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

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PRELIMINARY EXAMINATION OF CHANNEL FROM GALVESTON HARBOR TO TEXAS CITY, TEXAS.

UNITED STATES ENGINEER OFFICE,
Galveston, Tex., June 8, 1907.

GENERAL: In compliance with your instructions of March 14, 1907, I have the honor to submit the following report on preliminary examination of "Texas City channel, with a view to obtaining a channel two hundred feet wide and twenty-six feet deep."

Texas City is situated on the mainland of the west shore of Galveston Bay at approximately the point nearest the harbor entrance. The channel leading to it is a dredged channel. The natural depth in the line of this channel before dredging was from 4 to 8 feet. During 1895–96 a channel 16 feet deep was dredged by the Texas City Terminal Company. The existing project was designed to afford a channel 100 feet wide at the bottom and 25 feet deep extending from the Texas City wharves to 25 feet of water in Galveston Harbor, a distance of about 34,000 feet. At the time of the adoption of this project the old channel dredged by the Texas City Terminal Company had shoaled to its natural depth. The river and harbor act of March 3, 1899, appropriated $250,000 for the 25-foot channel. This channel was completed to prescribed cross section in May, 1905. To March 14, 1906, the channel had filled 984,300 cubic yards. Between February 1 and May 28, 1906, the Texas City Transportation Company removed 698,222 yards in maintaining and widening the channel. The maximum draft that could be carried June 21, 1906, was 21¼ feet. The variation of the water surface is about 1¼ feet. The channel has since shoaled to a ruling depth of 16½ feet.

The river and harbor act approved March 2, 1907, appropriated $60,000 for the maintenance of the channel. A contract has been awarded for the expenditure of about half of this sum in maintenance this year, work to commence in thirty days. This sum will restore the channel depth to 23 feet. It is propesed to expend the balance in maintenance next year.

The tonnage for the port of Texas City for the fiscal year ending June 30, 1905, as given by the collector of customs, amounted to 36,138 tons. That for the calendar year 1905,[a] 60,321 tons, valued approximately at $5,362,977. The tonnage for the first five months of the calendar year 1906, the latest data so far received, amounted to 26,246 tons, valued approximately at $1,739,421. The entire tonnage for 1906,[a] is given by Mr. H. B. Moore as 102,489, valued at $5,738,094. He also states that the figures for the first three months of 1907 have been greater than for the same period of 1906.

The efforts that have been made to use the existing channel indicate that it will be wise for the Government to make further improvement. The parties back of the project have shown a commendable spirit in making such use as they could of the channel, and in spending their

[a] Footnote added in Office Chief of Engineers:
The Texas City Company claims for the calendar year 1905 75,029 tons, valued at $5,957,470.
The collector of customs gives the commerce for the calendar year 1906 as 58,258 tons, valued approximately at $3,697,757.

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own money to improve it; also in their attempts to improve and maintain it at their own expense. All of the available depth and width has been used. There has been some trouble with ships grounding. This, of course, has had a bad effect, shipowners being less willing to charter their ships at reasonable rates under such circumstances. In general, the groundings have occurred from vessels getting out of the channel.

A width of 200 feet and a depth of 26 feet is now asked. I can not say positively that this width will not be needed soon. I incline to the opinion that an even greater width will eventually be needed. Galveston channel is extending along the front of Galveston Island and Houston ship channel is being laid across the bay. It seems likely that a channel will eventually be required along the front of the harbor line on the Texas City side connecting with both of these channels, and that the Texas City channel will afford a convenient outlet from this long connecting channel to the deep water between the jetties.

On the other hand, the Houston ship channel and the channel recently authorized to Port Bolivar are 150 feet wide and 25 feet deep. I therefore am inclined to the opinion that the Texas City channel should first be widened to 150 feet on the bottom, and that this channel should be given a trial to determine whether it will be adequate for present needs; if not, the question of further widening can be taken up later. Considerable business has been done on the 100-foot channel; it is certain that it is not wide enough, and it is equally certain that a widening of 50 feet will improve conditions materially. Most of the shoaling of the channel has taken place from the Texas City wharves to the eastern edge of Half Moon channel, or about station 18,000. From station 18,000 to station 34,000 the shoaling has not been very great. This latter section has a fair current along it. The current from the Texas City wharves to the Half Moon channel is largely across the dredged cut.

At the request of the parties interested in the improvement the material dredged from the channel was thrown on the south side of it, making a large shoal there which was above water in places, it being hoped that this would stop the cross current and cause some scour along the channel. This hope has not been to any great extent realized. I incline to the opinion that it will eventually be necessary to put dikes on both sides of the channel. For the present, I would suggest that one be placed on the north side only of the channel, starting at a point about 2,000 feet out from the harbor line and extending to Half Moon channel. The dike should not be permitted to come close to the harbor line, as a shoaling would probably be produced at the root of the apron, which would have to be removed when a channel is dug parallel to the harbor line. At any rate, it would be better to build the portion I have mentioned first.

Attention is invited to the accompanying letter from Mr. H. B. Moore, general manager of the Texas City Company, setting forth the reasons why he believes further improvement should be made. Special attention is invited to his remarks about the necessity for increased draft. In building the long warehouse on the pier the company made provision for a grain conveyor. Should the grain elevator be put in as they now contemplate, a greater draft of water

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can easily be utilized, as grain weighs much heavier than cotton and the other articles usually shipped from these ports.

In conclusion, I have the honor to report that in my opinion the improvement called for is worthy to be undertaken by the United States to the extent of a width of 150 feet and, in case the elevator is constructed or nearly finished by the time the appropriation is made, to a depth of 26 feet.

Very respectfully,

EDGAR JADWIN,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

OFFICE DIVISION ENGINEER, GULF DIVISION,
New Orleans, La., June 18, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army.

The immense agricultural production in Texas is beginning to tax the capacity of existing outlets, and the rise in value of exports has placed Galveston in the second place. The vast hinterland has such possibilities in corn, cotton, and cattle that ordinary foresight does not suffice in providing ways and means of handling these riches. The energetic men who have planned and executed shipping facilities at Texas City have shown their faith by their works. But a long narrow channel in this exposed bay is difficult to maintain, and without a fair prospect of increased use of this port there would be little reason for encouraging the widening and deepening of the channel. The tentative steps proposed by the district engineer are dictated by prudence. If a dike or dikes could be built as suggested the permanence of the channel would seem more probable, and certainly the shipping facilities already in sight appear to warrant the improvement asked, and I concur in the opinion of the district engineer that the channel should be deepened to 26 feet, but think that the width should be not less than 200 feet at bottom.

E. H. RUFFNER,
Colonel, Corps of Engineers,
Division Engineer.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., June 24, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

The original and present project for the improvement of the channel from Galveston Harbor to Texas City was adopted by act of March 3, 1899, which authorized the Secretary of War to enter into a contract or contracts for deepening this channel to a depth of 25 feet and width of 100 feet at the bottom, at a cost not to exceed $250,000. In conformity with this provision, a contract was entered into which involved the expenditure of the full amount authorized, and the channel was completed to the prescribed dimensions in May, 1905. The present inquiry has in view an increase of depth from 25 to 26 feet, and an increase in width from 100 to 200 feet.

This improvement having been completed only a few years ago, and the full projected depth having been available to navigation only for

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a short period, the full benefits of the improvement have not been realized; nevertheless, it appears that shipping interests have taken full advantage of the facilities available to traffic and have contributed to the work of maintaining the channel. Statistics of commerce are reported only for the year 1905, when imports and exports amounted to 60,321 tons, valued at approximately $5,362,977.

The district officer believes that an increase in width to 150 feet is justified by the commercial interests involved and that the proposed depth of 26 feet is worthy to be undertaken by the United States, providing certain commercial improvements now projected by local interests are consummated. The division engineer believes that the dimensions named in the act ordering this examination should be adopted.

It appears that during the ten months succeeding the completion of the work the channel filled 984,300 cubic yards, which would indicate that the cost of maintaining a deep-water channel between Texas City and Galveston Harbor will be so large as to demand careful consideration of the expediency of providing the increased dimensions now proposed.

No recommendation involving a survey or estimate of cost is submitted by the district officer, but the Board believes that further information as to the expense involved in increasing and maintaining the project so increased is essential to a final determination of the advisability of undertaking the further improvement. It recommends, therefore, that the district officer be authorized to submit an estimate of cost of the work which he proposes, and of that specified by the act ordering this examination, devoting special attention to the probable cost of maintenance.

For the Board.

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

[Fourth indorsement.]

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, June 26, 1907.

Respectfully submitted to the Secretary of War.

This is a report on preliminary examination of Texas City channel, Texas, authorized by the river and harbor act of March 2, 1907.

Inviting attention to the report of the Board of Engineers for Rivers and Harbors, in the preceding indorsement, I recommend that preparation of cost of improvement of the locality as proposed be authorized.

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

[Fifth indorsement.]

WAR DEPARTMENT,
June 27, 1907.

Approved as recommended by the Chief of Engineers in the preceding indorsement.

ROBERT SHAW OLIVER,
Acting Secretary of War.

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LETTER OF THE TEXAS CITY TERMINAL COMPANY.

TEXAS CITY TERMINAL COMPANY,
Texas City, Tex., June 7, 1907.

DEAR SIR: In response to your favor of April 29, inviting a report with regard to improvement of the Texas City channel, without making my report burdensome with statistics and opinions, I beg to report, briefly, some facts on general governing conditions.

Texas City channel was open for business September 20, 1904, on which date steamer service to Mexico was established.

On November 13, 1905, the Vogeman Line began operating a service from Texas City to Hamburg, Rotterdam, and Liverpool, loading their first boat, the steamer *Trafalgar* (4,478 net register tons), to her cubit capacity, with draft of 23 feet 6 inches. This boat grounded in the channel. According to survey shown in general average adjustment the reason was that channel was too narrow and shallow for this class and size of steamer. The next Vogeman Line boat was the *St. Irene* (3,197 net register tons), a smaller boat, that was secured in place of the regular line steamer, account trouble of previous vessel in Texas City channel. This boat loaded to her full capacity and navigated channel without difficulty, but the three following Vogeman Line steamers, the *Castanio*, *Madeline*, and *Cluden* were the large-type vessels used in European traffic, which made it necessary to load approximately 75 per cent of their cargo at Texas City docks and reship the remaining 25 per cent to Galveston docks by rail, to be loaded there, account inability of these vessels when fully loaded to navigate Texas City channel without hazard.

As a result of this extra expense the Vogeman Line withdrew its European service from Texas City until such time as the channel is made more suitable for large ships.

The Wolvin Line is now and has been operating a service from Texas City to Mexico since September, 1904, having three distinct lines, one to Veracruz, one to Coatzacoalcos, and one to Progreso, Yucatan, it having developed and increased its business until, regardless of the European service having been discontinued, the commerce through the port is constantly increasing, as shown by custom-house records, which are as follows:

Commerce of Texas City Harbor.

Calendar year.	Number of vessels.	Net register tonnage.	Cargo.	Valuation.
			Tons.	
1905	87	82,214	76,007	$3,774,515
1906	115	102,489	84,315	5,738,094

And for the first three months of 1907 the increases have been such as will make the calendar year of 1907 much greater than 1906.

The Wolvin Line formerly used steamers ranging from 2,000 to 2,500 tons capacity, with draft from 15 to 20 feet, as the ports in Mexico could not accommodate the larger size vessels. However, since the establishment of this service the Mexican Government has improved the harbors at Veracruz and Coatzacoalcos, making available 26 feet of water at both places, and improvements have been authorized for Progreso, providing for 26 feet of water at that port.

The eventual result of this will be larger ships in the United States and Mexican trade, in fact, the Wolvin Line in March of this year placed the steamer *Cedar-Grove*, a 4,200-ton d. w. boat, in its Mexican service, and for economical operation will soon be forced to replace all of its small vessels with larger ones.

The steamer line referred to has had some 12 or 15 cases where their ships had trouble in the Texas City channel, but only two boats had serious difficulty. The *Navigator*, on December 18, 1905, and the *Molina*, on December 8, 1907, both of which had to lighter their cargoes and make general average adjustments. The trouble in each instance was insufficient water and the channel so narrow that vessels could not be steered properly.

Without dealing with the improvements and growth of the town of Texas City, I will only mention that various interests have made investments in the

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modern port facilities that are at Texas City already constructed, aggregating more than $2,000,000.

The Texas City Terminal Company has just this month completed a four-mile extension of its terminal tracks to a connection with the G. C. & S. F. Rwy. at Hitchcock, at an expense of $95,000. The same company at the present time is constructing a modern grain elevator of 1,000,000 bushels capacity, which is to cost us $485,000, a portion of which has already been expended. There are also before the board of directors and stockholders of this company plans and specifications for two additional piers and two additional cotton warehouses, and 5 miles additional terminal tracks, the construction of which I am sure will be authorized, and regarding which we would like to make your department a later report.

For many years I have been engaged at Texas ports in the transportation of export and import commerce, and as the representative of the stockholders and directors of this company I have urged them to provide port facilities adequate to meet the increasing movement of traffic through this port. This has been done, and it is needless to say that along with these improvements, growth, and progress of business and facilities, the waterway to Texas City should and must have corresponding attention.

I have no engineering ideas to advance concerning the Texas City channel, but from a business man's standpoint there should be provided and maintained 26 feet of water to this port, and the bottom of the channel should be made wide enough for large steamers and sailing vessels to navigate same without accident or hazard, and it seems that revetments of the channel would be essential in economically maintaining deep water, but this is an engineering feature on which your department is better qualified to pass judgment than any outside interests.

All this company and the people and business institutions of Texas City want is an adequate depth of water, 26 feet, and the channel made wide enough so there will be no hazard in navigating same by large vessels.

We would like to make a further and more comprehensive report on this matter at a later date.

Yours, very truly,

H. B. MOORE,
General Manager.

Maj. EDGAR JADWIN,
Engineer Corps, U. S. A.

PLAN AND ESTIMATE OF COST OF IMPROVING CHANNEL FROM GALVESTON HARBOR TO TEXAS CITY, TEXAS.

UNITED STATES ENGINEER OFFICE,
Galveston, Tex., September 7, 1907.

GENERAL: 1. In compliance with your letter of instructions of July 1, 1907, directing a survey and estimates for 150 and 200 foot channels from Texas City to deep water, I have the honor to submit the following:

Estimated costs.

Channel 150 feet wide, 26 feet deep (without dikes)	$106,000
Yearly maintenance (without dikes)	71,000
Channel 200 feet wide, 26 feet deep (without dikes)	193,000
Yearly maintenance (without dikes)	95,000

The section of the channel that fills most rapidly is from the harbor line (approximately, station 1) to station 18. In order to allow for future development of the water front above and below the present wharfage at Texas City, no obstruction to free navigation should be placed within 2,000 feet of the harbor line. Half Moon channel (station 14–18) must be kept open to navigation, but pile-and-brush dikes could be placed on both sides of the Texas City channel, be-

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tween stations 4 and 14, without materially interfering with navigation. If this section be protected by dikes, we shall have:

Channel 150 feet wide, 26 feet deep	$106,000
Dikes, pile-and-brush, from station 4–14 (10,000 feet)	38,000
Total	144,000
Yearly maintenance, with dikes as above	40,000
Channel 200 feet wide, 26 feet deep	193,000
Dikes, pile-and-brush, from station 4–14 (10,000 feet)	38,000
Total	231,000
Yearly maintenance	60,000

2. The above estimates are based on the supposition that the work will be done by contract, and the unit price is taken at 10 cents per cubic yard, which is approximately the cost of contract work in this harbor, and also assuming that the fill in the proposed channels would bear the same proportion to the present fill as the widths of the proposed channels bear to the present width, and also that there would be practically no fill between the dikes.

3. The yearly maintenance bears a large ratio to the first cost of the channel. This is due to the faulty location of the channel, it being placed directly across the prevailing current in the bay, and as the bottom of the bay is very soft the channel fills up rapidly.

4. It will be seen that the construction of the proposed dikes will save nearly their cost each year.

5. However, the amounts estimated above for maintenance will not insure continuously a channel of the project dimensions if the maintenance is done by contract. If weather and storm conditions should be particularly favorable, the channel might be navigable for approximately its full depth for some little time after redredging, but a storm or bad weather conditions might decrease the depth a number of feet at some particular point or points, or even throughout long stretches of the channel.

6. My predecessor in charge of this district estimated $60,000 for maintenance of the present channel for two years. This amount allows redredging only once per year, which will not maintain the project depth continuously, that depth being in existence only immediately after the dredge has cleaned out the channel. At other times the depth will be gradually decreased until a depth of 16 or 18 feet exists. In other words, unless a dredge is available at all times to work in the channel where needed the project depth can not be maintained.

7. Under these circumstances if this channel is to be a practicable channel for commercial purposes there must be at all times a dredge available to do maintenance at whatever point shoaling takes place. For this reason it is, in my opinion, absolutely necessary that a dredge should be provided as a part of the project.

8. A suitable dredge for this channel, if run with a double or triple crew, would be available to do other maintenance work in Bolivar or Galveston channels. Such a dredge, under present market conditions, would cost approximately $125,000, and for operation with a triple crew $75,000. I am convinced that neither the 150-foot channel nor the 200-foot channel should be begun unless such a dredge is provided.

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9. The cost, then, of obtaining and properly maintaining each channel will be:

150-foot channel.

New work, dredging and dikes	$144,000
New dredge	125,000
Maintenance two years, at $40,000 per year	80,000
Total	349,000

200-foot channel.

New work	$231,000
New dredge	125,000
Maintenance two years, at $60,000 per year	120,000
Total	476,000

10. The Texas City interests desire that a dike be constructed on the south side of the channel to cut off the current flowing across the channel. Such a dike would undoubtedly protect the channel to a great extent and materially aid in its maintenance, and a dredge would then probably not be needed. Furthermore, a substantial dike or causeway thus located would assist in the development of Pelican Island and Spit on the north side of Galveston channel. Such a dike or causeway, however, would have to be a substantial structure protected by riprap on the north side, and its great cost is not warranted simply as a protection to the Texas City channel.

11. The present commerce at Texas City does not, in my opinion, warrant the expenditure necessary to widen, deepen, and maintain the channel beyond that provided for by the present project.

12. While the prospective commerce of Galveston Harbor is immense and the increase will be rapid, how much would or could be deflected to Texas City is an indeterminate question.

13. The improvement of the Texas City channel should be taken up in connection with broad plans for the improvement of Galveston Harbor as a whole.

14. In view of the high cost of the proposed improvement, the faulty location of the channel, and the high cost of maintenance without a dike to the south of the channel, I feel that the question of widening and deepening this channel should be deferred until the broad question of the development of Galveston Harbor may be taken up and a comprehensive plan formed for the future growth of the harbor. However, as dikes as proposed in paragraph 1 would give considerable relief and reduce the annual cost of maintenance, I recommend that $40,000 be appropriated for the construction of such dikes.

Very respectfully,

JOHN C. OAKES,
Captain, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First Indorsement.]

OFFICE DIVISION ENGINEER, GULF DIVISION,
New Orleans, La., September 9, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army, with the recommendation that a channel 200 feet wide and 26 feet deep

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be provided for Texas City, and that the dikes suggested be also provided for, the whole at the estimated cost of $231,000; also that at least $50,000 be provided per annum for maintenance. Deep and wide channels are less subject to the action of storms than shallower ones.

E. H. RUFFNER,
Colonel, Corps of Engineers,
Divison Engineer.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., November 25, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

The district officer submits estimates for a channel 200 feet wide and 26 feet deep, as called for by the act, and also for one 150 feet wide of similar depth, both with and without protecting dikes, covering work by contract and by Government dredge.

Based on the information developed by the survey, the district officer has arrived at the conclusion that it is not advisable to increase at this time the dimensions of the existing project, and that the question of widening and deepening this channel should be deferred until the broad question of the development of Galveston Harbor may be taken up and a comprehensive plan formed for the future growth of the harbor. He is of opinion, however, that a part of the existing channel should be protected by dikes, with a view to decreasing the large cost of maintenance under the existing project. The estimated cost of these dikes is $40,000 and to this extent only he believes the project should be modified. The division engineer is of opinion that a channel should be provided with the dimensions proposed in the act calling for this investigation, namely, a channel 200 feet wide and 26 feet deep, and that at least $50,000 annually should be provided for maintenance.

The excavation of the Texas City channel was begun by private parties in 1895, and its location was such that rapid filling was inevitable. Work by the United States was begun in accordance with an item in the river and harbor act of 1899, and without any preliminary examination ever having been ordered or made, and without the usual formal report favorable to the improvement. The appropriation made by this act was $250,000, and the Secretary of War was authorized to enter into a contract for a channel 25 feet in depth and 100 feet bottom width. The project dimensions were secured in May, 1905, and in a period of ten months thereafter the channel had filled 984,300 cubic yards, or at the rate of about 1,100,000 cubic yards per year. Between February 1 and May 28, 1906, the Texas Transportation Company removed from this channel 698,222 cubic yards, and it is stated that on June 21, 1906, the maximum draft that could be carried through the channel was 21¼ feet, since which time it has shoaled to a depth of 16½ feet. These results forcibly demonstrate the shifting character of the material through which the channel has been dredged, and emphasize the uncertainty and great cost of maintaining a channel of any specific dimensions.

Under the act of March 2, 1907, $60,000 was appropriated for maintenance, and it is proposed to expend $30,000 annually for the next two years, with which it is expected to restore the channel to a

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depth of 23 feet each year. The district officer now states, however, that this amount will allow for redredging only once each year, which will not continuously maintain this depth, as the dredged channel will immediately begin to fill after having been passed over by the dredge, and that the depth will probably decrease to 16 or 18 feet before the next operations. It will be seen, therefore, that with a project depth of 25 feet, which has once been secured and once restored to 23 feet by the removal of an immense amount of material, the further expenditure of $30,000 a year will probably result only in an available channel 16 to 18 feet in depth. It is generally conceded by navigation interests that the real value of a channel depends upon the depth which can be counted upon at all times and not upon that which is periodically made available.

The district officer estimates the cost of maintaining channels 26 feet in depth, 150 feet and 250 feet in width, at from $40,000 to $95,000 annually, depending upon the width of the channel and the method employed for carrying on the work. When we consider the amount of commerce to be benefited by this channel, now reported at from 60,000 to about 85,000 tons, it at once becomes apparent, by comparison with other improvements, that the expenditure for maintenance is excessive. The amount involved would be justified only by the existence of a commerce many times greater than that now reported.

Those known to be interested were invited to submit their views regarding the necessity and advisability of the United States undertaking the further improvement of this channel, and several communications have been received. In these the difficulty of navigating the channel in its present condition and of chartering large steamers for business at the Texas City docks is fully set forth, as well as the advantages to be gained from additional facilities. On November 25 Mr. H. B. Moore and Mr. H. A. Kelly appeared before the Board in reference to this subject, and presented orally and in writing additional data, explaining more fully the grounds upon which the demand for this improvement is based.

The Board recognizes and fully appreciates the difficulties and drawbacks under which Texas City interests are laboring and the great advantage it would be to them to have a permanent and deep channel capable of being used at all times by the largest vessels, but it has to face the experience already had in trying to maintain a channel 25 feet in depth, and is compelled to recognize the failure to do so, and the great cost that must be incurred to give any assurance of success in maintaining the channel as at present projected. The maintenance of a channel of greater dimensions must necessarily involve a still greater cost.

City is only a few miles from the port of Galveston and, as rail connections are concerned, is on a par with it. The nel is a benefit common to both places. In order to pro- ie commerce at Galveston there is, in addition, the dredging erior channel, and for the commerce of Texas City the of the Texas City channel, but experience has shown clearly ost per ton of commerce of maintaining the interior channel eston is much less than at Texas City.

the growing commerce of Galveston and vicinity will in a ears demand largely increased facilities is not improbable, and

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in this event additional provision for the commerce at Texas City may become advisable, but the Board believes that the consideration of further provision for that place should be postponed until it is brought up in the future in connection with broad plans for the development of Galveston Harbor.

The amount involved under the present plan of maintaining the Texas City channel by dredging is not definitely known, but is evidently considerably more than $30,000 annually, which amount is large as compared with the existing commerce. It is possible, however, to reduce somewhat the cost of maintenance by protecting a part of the channel by dikes, as proposed by the district officer, at an estimated cost of $40,000. These dikes constitute a measure of maintenance and may be put in at any time should Congress supply sufficient funds, and in the opinion of the Board such action is advisable if an effort is to be made to preserve the channel.

In view of the facts presented above, the Board has reached the conclusion that it is not advisable at the present time for the United States to undertake the extension of the improvement of Texas City channel " with a view to obtaining a channel two hundred feet wide and twenty-six feet deep."

For the Board.

D. W. Lockwood,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 403.

FORKED RIVER, NEW JERSEY.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORTS OF EXAMINATION AND SURVEY OF FORKED RIVER, NEW JERSEY, FROM ITS MOUTH TO THE TOWN OF FORKED RIVER.

DECEMBER 21, 1907.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 19, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated 17th instant, together with copies of reports from Maj. C. A. F. Flagler, Corps of Engineers, dated April 24 and October 16, 1907, of a preliminary examination and survey, respectively, of Forked River, New Jersey, from its mouth to the town of Forked River, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 17, 1907.

SIR: I have the honor to submit herewith for transmission to Congress reports of April 24, 1907, and October 16, 1907, by Maj. C. A. F. Flagler, Corps of Engineers, on preliminary examination and survey, respectively, authorized by the river and harbor act approved March 2, 1907, of Forked River, New Jersey, from its mouth to the town of Forked River, with a view to obtaining a depth of 5 feet.

As a result of the examination it was found that a survey would be necessary to determine the advisability of the proposed improvement, and a survey was accordingly ordered as provided by law.

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In the view of the excessive cost of the necessary work, as compared with the commercial interests involved, I concur in the opinion expressed by the district officer, the division engineer, and the Board of Engineers for Rivers and Harbors that Forked River is not worthy of improvement by the United States at the present time.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF FORKED RIVER, NEW JERSEY, FROM ITS MOUTH TO THE TOWN OF FORKED RIVER.

ENGINEER OFFICE, UNITED STATES ARMY,
Wilmington, Del., April 24, 1907.

GENERAL: I have the honor to submit the following report on the preliminary examination of Forked River, New Jersey, provided for in the river and harbor act of March 2, 1907, assigned to me by letter from the Chief of Engineers dated March 14, 1907.

Section 3 of the above act provides for preliminary examinations and surveys as follows:

* * * * * * *

Forked River [New Jersey], from its mouth to the town of Forked River, with a view to obtaining a depth of 5 feet.

* * * * * * *

A preliminary examination was made and an informal hearing held at Forked River on April 18–19, 1907, by Mr. George W. T. Miller, assistant engineer. The following statistics are quoted from his report:

No examination of Forked River was ever made before the present one by the General Government.

Forked River is a shallow arm of Barnegat Bay, entering the bay from the westward about 5 miles northwest of Barnegat light, and about 7 miles from Barnegat Inlet as a vessel would sail. About 1 mile from the mouth, and again a quarter of a mile farther up, the river forks making three large branches, South, Middle, and North branches, whence the name of the river. The North Branch may be called the main stem, as it is the one upon which the town is located and upon which all the business centers. All three branches have their headwaters in the neighboring cedar swamps, but the North Branch is longer, has a much larger volume of fresh-water inflow, and has above the town two large sawmills for which it furnishes the water power. Two miles from the mouth, at the town, a fixed bridge crosses the river carrying the State highway, a fine gravel road. The road provides direct and continuous communication between New York and Atlantic City and is used now by hundreds of automobiles whose occupants make Forked River one of the wayside stopping places along the route for rest and refreshment. This business is very profitable, as is evidenced by the fact that Forked River has four large and prosperous hotels and three large boarding houses.

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The river from the mouth up to the confluence of the Middle and North branches flows through salt marsh whose elevation is about 1 foot above the ordinary level of the water surface. The river is about 500 feet wide at the mouth, has numerous deep coves, principally on the southern side, and contracts in width to about 100 or 125 feet where the Middle and North branches separate. This far up the river bottom is mainly soft black mud, across which several isolated hard ridges of shells and sand extend. Above the upper forks mud and sand are encountered, the mud soon disappearing, leaving a white sand bottom. Above the upper forks the water in the North Branch is very clear, although having a brownish hue from the cedar roots in the swamps where the streams have their rise. The ordinary range of tide is about 6 inches, and tidal influence is felt up to the town bridge ordinarily. Taking the upper forks as the dividing line, below that point the current is very sluggish, in fact, hardly perceptible even on the ebb, while above where the stream quickly narrows to a minimum of about 40 feet at the bridge, the ebb develops a strong current. The depth of water at the mouth of the river is 5 feet at low water, shoaling in the first half mile upstream to about 3 feet and maintaining about this depth to the public landing, just above the upper forks, with several spots, however, where a depth of but 2 to 2½ feet was found. From the public landing the depth gradually shoals to less than a foot at the bridge, although there are some deep holes at the bends in this stretch of river. This portion of the river was formerly within the limits of the cedar swamp and the stream is obstructed by stumps and snags, although many have been taken out and the work of removing others is continually going on.

The shoaling of the river first became noticeable and reached a stage where it began to seriously interfere with navigation in the early seventies. Local opinion attributes the shoaling to the sawdust dumped into the river by the mills above for many years, until it was stopped by a State law; also to the frequent breaking of the milldams in years past, whereby the accumulation of sediment back of the dams was washed in a mass to the lower river. A realization of the damage so done to the interests of the community has bred a watchfulness and care which prevent the breaks now.

The village of Forked River dates from about 1739. It always has been a settlement of sailors and fishermen and the agricultural interests even at the present time remain comparatively undeveloped beyond the necessities of the community. Barnegat Bay, with its immense stores of fish, clams, and oysters, is the source from which the people have always gained their living, and now that the 2 miles of river between the bay and the town have become so shallow, it is a struggle to keep up the communication for those who are compelled to. Some have been driven to other localities and still others, who have expressed a desire to settle there or to have summer homes there, will not do so on account of the river. The village can not move out to the bay shore, for it is now located on the edge of the fast land with nothing but low, flat, frequently submerged marsh between it and the bay.

The winter, or permanent, population of Forked River is about 600 and by a very conservative estimate the influx of sportsmen and pleasure seekers raises this number to between 1,000 and 1,200

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the four warm months of the year—June to September. No count has ever been taken of the automobilists who stop off en route nor of those who come by boat from nearby seaside resorts to buy supplies, but the register of the largest hotel showed 3,000 guests for the five busy months of last year. The duration of the stay of these registered guests was from one day to two weeks or more. A spur of the New Jersey southern division of the Central Railroad of New Jersey, leaving the main line at Lakehurst, passes through the towns of Toms River and Forked River and terminates at Barnegat, about 6½ miles south of Forked River. The train service is poor and connections inconvenient. Towns along the bay within a few hours' sail of Forked River require two and three days for freight to reach them from Forked River by rail, and this freight has to be handled by two, and sometimes three, railroad companies in transit.

Harvey Cedars, a resort on Barnegat Bay, is 12 miles distant by water from Forked River, but by rail in shipping freight the distance is about 50 miles. The average freight rate to these places is $40 per car, while the same amount of goods could be delivered by boat or scow for about $10. A great deal of the traffic that continues to use the water route has to be lightered in very small boats to the mouth of the river, and the fact that this traffic still exists, handicapped as it is, demonstrates the advantages of the water route. The year 1873 marked the advent of the railroad and the disappearance of the commerce of the river in large vessels and of shipbuilding, which had been an active industry from the earliest times. There are now two boat yards, each with a marine railway, carrying on business, but it is impossible to get boats to either of them drawing 3 feet of water or more. Notwithstanding this, they both do a thriving business building and repairing the shallow-draft boats used in Barnegat Bay and elsewhere in the inside waters of the New Jersey coast.

Prior to 1873 there were six coasting schooners trading from Forked River to New York and other ports, carrying some 3,500 cords of wood and 30,000 bushels of charcoal and bringing back general merchandise. This trade is entirely gone and no hopes are entertained of its revival. It indicates, however, the former navigable capacity of the river. What is desired by those interested is a channel to allow the free and unobstructed passage of the fleet of fishing and pleasure craft, both owned in and visiting Forked River, and the traffic from there to the many towns and summer resorts along the New Jersey coast.

Fully three-quarters of the population of Forked River derive their livelihood from the waters of the river and of Barnegat Bay. The products of the sawmills, cedar and pine, go into boats and buildings along the near-by coast, and the preservation of the channel in the river is vital to the continued development of the town.

Statistics.

The boat property at Forked River is as follows:

2 house boats valued at	$2,500
3 scows (10 to 16 tons) valued at	600
40 sail and power boats for hire, from which the owners derive a living	20,000
7 power surfboats	2,000
20 pleasure boats, sail and power, making Forked River their headquarters	25,000
Total	50,100

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The value of the hotel properties used in the entertainment of guests attracted solely by the sailing and fishing is	$100,000

There are in Forked River:	
4 hotels and 3 boarding houses, doing a yearly business of	$100,000
3 sawmills, doing a yearly business of	10,000
2 boat yards, doing a yearly business of	12,600
4 stores, doing a yearly business of	23,000
1 bottling establishment, doing a yearly business of	3,600
40 sailing and power boats, doing a yearly business of	20,000
1,000 tons of salt hay shipped, at $6	6,000
75 tons of seaweed shipped, at $10	750
500 barrels of fish shipped, at $10	5,000
5,000 bushels of oysters shipped, at $1	5,000
500,000 clams, valued at	3,000
Cranberries, valued at	3,000
Total	191,950

A large portion of this traffic must be ultimately shipped by rail, but in every case and class of business noted the navigation of Forked River enters as an important element either in gathering the products or in distributing them. The increase in business contingent upon the improvement of the river would be doubtless large. The boat yards are now turning away work because the boats can not reach them. Many who would make Forked River headquarters for their boats or winter them there can not do so for the same reason, and many acres of salt hay are left uncut and burned in the early spring because of the impossibility of handling it by water between the marshes and the town. Farming would also be encouraged and assisted by the improvement of the river, not only by having an outlet provided for reaching the bay and seashore towns with the farm products, but also by making it possible to bring mussels in for fertilizer. Immense beds of mussels exist in Barnegat Bay and these can be secured for as low as 2 cents a bushel. They are the best adapted fertilizer for the light sandy soil of this region, where the ordinary manufactured fertilizer, aside from costing many times more, is of little use.

A general desire is expressed for a width of 75 feet from the mouth to the public landing, a distance of about 1½ miles. Thence to the upper boat yard, a further distance of about one-third of a mile, the greatest width that the river would stand is 40 to 50 feet. The depth of 5 feet, stipulated in the act, is considered as satisfactory and well adapted to the river. No improvement is deemed necessary between the upper boat yard and the bridge, about one-fourth of a mile, as traffic does not go beyond the boat yard.

A careful consideration of the above statistics leads me to recommend the river as worthy of improvement by the United States if the same can be made effective by a reasonable expenditure. Whether this is the case can be determined only by a survey, which I respectfully recommend be authorized. The cost of survey is estimated at $350.

Very respectfully, your obedient servant,

C. A. F. FLAGLER,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

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[First indorsement.]

U. S. ENGINEER OFFICE, EASTERN DIVISION,
New York City, April 29, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army, concurring in opinion and recommendation of district officer.

AMOS STICKNEY,
Colonel, Corps of Engineers,
Division Engineer.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., May 7, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

From the description of this stream and its surrounding interests as given within it appears that the locality may be worthy of a moderate expenditure to provide better navigation facilities.

To determine the cost of the improvement, which is essential before a final opinion as to the advisability of the United States undertaking the work can be given, the district officer and the division engineer unite in recommending that a survey be made at an estimated cost of $350.

Believing that the merits of the case can be determined only in this way, the Board concurs in the recommendation that the survey be authorized.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

[Fourth indorsement.]

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, May 11, 1907.

Respectfully submitted to the Secretary of War.

This is a report on preliminary examination of Forked River, New Jersey, authorized by the river and harbor act of March 2, 1907.

Inviting attention to the report of the Board of Engineers for Rivers and Harbors, in the preceding indorsement, I recommend that a survey of the locality as proposed be authorized.

FREDERIC V. ABBOT,
Acting Chief of Engineers.

[Fifth indorsement.]

WAR DEPARTMENT,
May 13, 1907.

Approved.

ROBERT SHAW OLIVER,
Assistant Secretary of War.

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SURVEY OF FORKED RIVER, NEW JERSEY, FROM ITS MOUTH TO THE TOWN OF FORKED RIVER.

ENGINEER OFFICE, UNITED STATES ARMY,
Wilmington, Del., October 16, 1907.

GENERAL: As directed in letter from the Office of the Chief of Engineers dated May 15, 1907, I have the honor to submit the following report upon the survey, with project and estimate, for the improvement of Forked River, New Jersey. This survey was made in June, 1907, and detailed report thereof, with projects for various widths of channel and estimates therefor, are contained in the report of Mr. George W. T. Miller, assistant engineer, inclosed herewith.

A depth of 5 feet for this improvement was specified in the river and harbor act of March 2, 1907, providing for the preliminary examination of Forked River, and survey determines the fact that it is necessary, in order to obtain such depth, to excavate by dredging a channel about two miles long downstream on Forked River from a point about 500 feet below the bridge in the village of Forked River. The upper half mile of this stretch will permit a channel of only 40 feet in width to be made owing to the narrowness of the stream, and for a distance of about a quarter of a mile below that the maximum width is limited to 60 feet. From this point to the 5-foot depth into Barnegat Bay (about a mile and a quarter) the width of the stream is such as to permit any desired width of dredged channel. The desires of those interested in the navigation of the stream, brought out in public hearing held in connection with the preliminary examination upon which I submitted report under date of April 24, 1907, are for a channel width of 75 feet. As just stated, this width can not be obtained in the upper reaches of the river. With the information obtained by the survey, estimates have been made of the cost of constructing and maintaining channels of 5-foot depth with various widths, as follows:

(*a*) Seventy-five feet at the mouth reduced to 60 feet and 40 feet in the upper waters: $25,410 for construction and $2,500 for annual maintenance.

(*b*) Sixty feet from the mouth for a mile and a half and thence 40 feet to the upper limit of improvement: $21,830 for construction and $2,300 for annual maintenance.

(*c*) Fifty feet in width from the mouth for a mile and a half and thence 40 feet in width to the upper limit of improvement: $18,900 for construction and $2,000 for annual maintenance.

(*d*) Forty-foot width throughout: for construction, $17,300; for annual maintenance, $2,000.

The above estimates are computed on the basis of completing the entire work during one working season by a single contract, and the costs of maintenance as estimated are based on the supposition that such dredging as would be required would be done every two or three years, using the combined amounts estimated for annual maintenance. There are no dredges available in the vicinity for doing this work and any such must be brought from a distance, which condition would largely increase the cost if the work be subdivided.

The cost of the work of constructing and maintaining the dredged channel 5 feet deep, as developed by the survey, is so large even for a 40-foot channel which would not in my opinion offer much encouragement to navigation, and for the larger widths being still more excessive, I am compelled to say that I do not think that the interests involved as reported upon in connection with the preliminary exami-

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nation are sufficient to justify the United States in undertaking the improvement of this stream. If in the future these interests should increase the question of improvement would then very properly become the subject of further investigation.

Very respectfully, your obedient servant,

C. A. F. FLAGLER,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

U. S. ENGINEER OFFICE, EASTERN DIVISION,
New York City, October 18, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army, concurring in the views and recommendations of the district officer.

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Division Engineer.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., November 11, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

The survey of Forked River develops the fact that its improvement to a depth of 5 feet, as specified in the act, will require dredging over the entire distance of 2 miles from the mouth to the village of Forked River; that for the upper section of 2,600 feet it is impracticable to secure a greater width than 40 feet; that below this section the width may be increased to 60 feet for a distance of 1,200 feet, and in the lower section to any reasonable width desired. The cost of a channel 5 feet in depth, 40, 60, and 75 feet in width, respectively, in the sections mentioned is estimated at $25,410, and its maintenance at $2,500 annually, while the cost of a channel 40 feet in width throughout, the least that will admit of practicable navigation, is estimated at $17,300, and $2,000 annually for maintenance.

The district officer and the division engineer are of opinion that the cost of construction and maintenance, even for the 40-foot channel, is so large that when compared with the interests involved the improvement would not be justified by the United States.

At present there is very little commerce on this stream, and while the improvement contemplated would no doubt result in some increase in water-borne traffic and in certain benefits to the community the conditions are such that no extensive commerce could be expected to develop.

Comparing the cost of construction and the subsequent maintenance of this channel with the probable benefits to result therefrom, the Board has arrived at the conclusion, concurring with the views of the district officer and the division engineer, that it is inadvisable for the United States to undertake this work.

Those known to be interested were given an opportunity to present their views to the Board regarding the necessity and advisability of

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the proposed improvement, but no communications upon this subject have been received.

For the Board:

H. F. HODGES,
Lieut. Col., Corps of Engineers,
Senior Member Present.

REPORT OF GEORGE W. T. MILLER, ASSISTANT ENGINEER.

WILMINGTON, DEL., *September 28, 1907.*

MAJOR: I have the honor to report upon the survey of Forked River, N. J., and to submit the chart,[a] with a project and estimate of the cost of improving the channel from Barnegat Bay to the village of Forked River.

The river and harbor act of March 2, 1907, called for a preliminary examination of the river with a view to obtaining a 5-foot depth to the village. This examination was made and reported upon under date of April 22, 1907, and I respectfully refer to that report for a general description of the river and commercial statistics.

The survey subsequently ordered was made in June, the field work in charge of William E. Snyder, inspector, occupying four days, 10th to 13th, inclusive, excepting tidal observations, which were continued until the 24th. Two tidal-observation stations were established—one near the mouth and one near the bridge, at the head of navigation. The mean range of tide during the period of observation upon these two gauges was seven-tenths and six-tenths of a foot, respectively, and the extreme range was 1.2 feet and 1.1 feet, respectively. The high and low waters occur about fifteen minutes later at the upper gauge than at the lower one. The tides, as may be seen by the small rise and fall, are very feeble, but the water level fluctuates much more at times, due to the wind.

The North Fork, the one under consideration for improvement, has a sandy bottom and a good current, due to land flow, down to Enos Landing, almost to its junction with the Middle Fork. Below this point the united streams flow through marsh lands, whose elevation is about a foot above the ordinary high-water level, and the bottom of the river is muddy.

The distance from the bridge in the village to the mouth, along the line of the river, is 12,300 feet, but the upper 500 feet is very narrow, shallow, and has no traffic. Hence the length of river to be improved is 11,800 feet. From the upper boat yards to the public dock, a distance of 2,600 feet, the maximum width of dredged channel, owing to the narrowness of the stream, can be only 40 feet. For a further length of 1,200 feet 60 feet will be the greatest width allowable, but thence to the mouth the width would only be governed by the limit of cost deemed commensurate with the value of the business benefited.

In the upper section, where the 40-foot width prevails, the project contemplates some straightening by cutting back several sharp points, but from the public dock down the line of improvement follows as nearly as practicable the line of greatest depth.

The cost of this improvement will be relatively large on account of the distance a dredging plant will have to be transported, and also the difficulty of disposing of the dredged material from the lower river. To cast the material over will require several handlings; to pump it will require banking in an area to receive it, as no banks exist now, and to scow it out into Barnegat Bay will require the bureau of shell fisheries of New Jersey to designate dumping grounds where oysters and clams will not be destroyed. None of these obstacles are serious, but add to the difficulty of doing the work and correspondingly increase the cost.

At the public hearing held during the preliminary examination 75 feet was the width asked for where practicable; the depth is fixed at 5 feet at mean low water by the river and harbor act. For a channel 5 feet deep at mean low water and 75 feet wide from the mouth of the river 8,000 feet upstream, thence 60 feet wide for 1,200 feet, and thence 40 feet wide 2,600 feet to the head of navigation there will have to be dredged 105,000 cubic yards, place measure.

105,000 cubic yards, at 22 cents	$23,100
Add 10 per cent for contingencies and engineering	2,310
Total	25,410

This channel will require $2,500 annually for maintenance.

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[a] Not printed.

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For a channel 60 feet in width from the mouth to the public dock (9,200 feet) and thence 40 feet as above, the dredging will amount to 86,300 cubic yards.

86,300 cubic yards, at 23 cents	$19,849
Add for engineering and contingencies	1,981
Total	21,830

For maintenance this channel will require annually $2,300.

For a channel 50 feet in width to the public dock (9,200 feet) and thence 40 feet in width to the head of navigation, 2,600 feet, 74,700 cubic yards of dredging will be required.

74,700 cubic yards of dredging, at 23 cents	$17,181
Add about 10 per cent for engineering and contingencies	1,719
Total	18,900

A further reduction in width to 40 feet throughout will give dredging to the amount of 65,500 cubic yards.

65,500 cubic yards, at 24 cents	$15,720
Add about 10 per cent for contingencies	1,580
Total	17,300

For the 50-foot and 40-foot channels, the annual maintenance is estimated at $2,000.

The upper section of river with its clear water gives promise of a fairly permanent channel as the dredging extends from bank to bank, and the banks are well protected by roots and sod, but below, the muddy bottom will shoal at the sides on account of the suction of passing boats; this will be almost the same for any widths not greatly varying. The shoaling from sediment will of course be greater in the greater widths and therefore require more material to be dredged.

The estimates for the greater widths are in compliance with the wishes of those interested, who had in mind the accommodation of sail as well as power boats, but the cost seems prohibitive.

Now that power boats are so universally used, and sailboats in the minority, it would seem that the 40-foot channel or the 50-foot channel ought to meet all the needs of the river, both present and reasonably prospective. Either width will give ample passageway for any power boat used on the river and for any sailboat or scow in tow.

The estimates are based upon the supposition that the amounts, being relatively small, will be appropriated at one time; otherwise, the expense of moving a dredging plant and possibly preparing a dumping basin will greatly increase the cost.

Very respectfully, your obedient servant,

GEORGE W. T. MILLER,
Assistant Engineer.

Maj. C. A. F. FLAGLER,
Corps of Engineers, U. S. A.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 444.

ONTONAGON HARBOR, MICHIGAN.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF ONTONAGON HARBOR, MICHIGAN.

JANUARY 6, 1908.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 23, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated December 20, 1907, together with copy of a report from Maj. Graham D. Fitch, Corps of Engineers, dated September 14, 1907, of a preliminary examination of Ontonagon Harbor, Michigan, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 20, 1907.

SIR: I have the honor to submit herewith for transmission to Congress report of September 14, 1907, by Maj. Graham D. Fitch, Corps of Engineers, on preliminary examination authorized by the river and harbor act approved March 2, 1907, of Ontonagon Harbor, Michigan, with a view to determining whether a change in the course of the Ontonagon River may not aid in maintaining the harbor.

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From the facts and for the reasons given I concur in the opinion of the district officer, the division engineer, and the Board of Engineers for Rivers and Harbors that this locality is not worthy of improvement by the United States in the manner proposed.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF ONTONAGON HARBOR, MICHIGAN.

UNITED STATES ENGINEER OFFICE,
Duluth, Minn., September 14, 1907.

GENERAL: 1. In compliance with Department letter of March 14, 1907, I have the honor to submit the following report upon a preliminary examination of "Ontonagon Harbor, with a view to determining whether a change in the course of the Ontonagon River may not aid in maintaining the harbor."

2. *Historical.*—The harbor of Ontonagon is situated on the south shore of Lake Superior between the Apostle Islands and Keweenaw Point and was made a harbor by improving the mouth of the Ontonagon River, which before its improvement in 1867 had a depth of but 7 feet at the entrance. The project for its improvement by the Government, adopted in 1867 and completed in 1889, followed the usual method, namely, that of building parallel piers or jetties on either side of the entrance in order to confine the flow of the river, induce scouring, and prevent filling from the littoral movement of sand, and of dredging a channel between the piers to supplement the scouring action of currents. The depth proposed to be secured and maintained was 12 feet.

3. *Maintenance by dredging.*—During the first fifteen years after the completion of the project—that is, from 1889 to 1904—the amount of dredging by the United States to maintain the channel was 74,807 yards, or an average of 5,000 yearly. During this period dredging was not done every year, but only three times—in 1891, 1894, and 1903. The dredging was usually to a depth of 15 or 16 feet, for a width of about 100 feet. Between the dates of dredging, the channel would gradually fill up to about 12 feet, and when the channel became shoaler it was redredged.

4. During this period the channel fulfilled fairly well the requirements of navigation, enabling coasting vessels to enter and lumber carriers to load to the usual draft of from 12 to 14 feet. The fact that a large sawmill was built three years ago is evidence that the harbor afforded the necessary facilities for the shipment of lumber.

5. During the last three seasons, however, including the present one, the shoaling has been much greater, leaving an available depth of 10 feet, and even less, so that dredging to the amount of 130,247 yards was done by the United States. This is an average of 43,000 yards annually, as against 5,000 yards annually during the fifteen preceding years.

6. It should be stated that the Government dredging has been supplemented by private dredging, at various times, in the inner [illegible]irectly in front of the wharves, the amount of which has [illegible]s been of record in this office.

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7. The unusual shoaling of the last three springs has caused delays to navigation and commerce in the early portion of the season, while waiting for the channel to be opened by the Government, and in particular to the shipments of lumber, which form the chief business of this port.

8. The direct appropriations by Congress for this harbor were insufficient for coping with this recent shoaling, being but $3,000 in the river and harbor act of March 3, 1905, and $5,000 in the act of March 2, 1907, but additional allotments were made from the emergency appropriation for river and harbor works in each of the last three years named to afford relief in the emergency. Thus there was allotted $5,000 in 1905, $5,000 in 1906, and $10,000 in 1907. Without these allotments the lake business of this port, with the exception of fishing, would have been interrupted for an indefinite length of time, unless private interests had taken up the work of opening up the harbor, at a cost which would have taxed them severely. As it was the county authorities and the largest lumber company expended considerable sums in those years for dredging along the inner harbor.

9. The recent interruptions to business by shoaling of the harbor undoubtedly led the people of Ontonagon to suggest the remedy mentioned in the river and harbor act of March 2, 1907, namely, the changing of the course of the river, and which forms the subject of this report.

10. *Cause of shoaling.*—The first subject of inquiry is properly in regard to the cause of the recent unusual shoaling in the harbor.

11. In the memorial[a] of the harbor committee of the Ontonagon Business Men's Association (copy herewith) an explanation is offered, in these words:

> We think that the reason for this is to be found in the fact that considerable timber has been cut off at the headwaters and along the banks of the river. This means that the soil is much more easily washed away than it was in years past before any considerable amount of timber was cut. And this, we believe, accounts for the more rapid filling of the harbor in recent years than was the case formerly.

12. It is undoubtedly true that the land immediately adjacent to the Ontonagon River and its tributaries has been denuded of timber by logging operations, but I can not see that this would have the effect stated, for the reason that the roots of the trees remain in the soil and in the place of the trees removed there has sprung up a growth of smaller trees, bushes, grass, weeds, etc.

13. Forests are supposed to promote the regularity of stream flow by retarding the surface flow and so increasing the percolation as well as delaying and decreasing the flood flow. There may be some question as to the extent of this action in the open season, but it is known that forests retard the melting of snow and in northern latitudes this would probably decrease the early spring floods.

14. There is one fact, however, which throws doubt upon any relation between the removal of timber and the shoaling of this harbor, namely, the fact that logging operations on the Ontonagon River have been going on continuously for many years, certainly for the last twenty-six years and probably for a longer period; thus whatever the effect produced by the removal of timber, the change in this instance should be a gradual one, whereas the unusual shoaling com-

[a] Not printed.

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plained of occurred suddenly for the first time two and one-half years ago.

15. A deposit of stamp sand from the Victoria Copper Mining Company's mill on the west branch of the Ontonagon River, at a distance (by the river) of about 20 miles from the harbor, has been mentioned as a possible cause of the shoaling in the harbor.

16. This mill has been running about a year and a half, with a single stamp head, and is discharging into the river, with the approval of the Secretary of War. An examination of the river made in August, 1907, by Mr. E. K. Coe, junior engineer of this office, showed that the stamp sand has been carried down the river for about 2 miles only, and that there are no signs of this sand in the dredgings at the harbor.

17. The fact that the recent shoaling began before the stamp mill started running is proof that it was not caused by the latter.

18. Logging on the river undoubtedly increases the erosion of the bed and banks and may add to the shoaling of the harbor.

19. Mr. Holahan, of Holahan & Whiting, lumber inspectors, Duluth Minn., who is familiar with logging operations on the Ontonagon River, offers an explanation or theory as to the cause of the recent shoaling which is worthy of notice. He believes that the greater shoaling of this year and last year lies in the fact of there being fewer ogs in the river than formerly. In the years when the logs were all brought down the river there was a log jam formed each spring which filled up the river channel full from the bottom to from 4 to 14 feet above the water surface and for a distance of 12 to 15 miles, beginning at the jam piers which are located about 2 miles above the harbor. This jam caused the flood waters to spread out over the low lands, where it deposited a great deal of sand, while the channel escaped the scouring from the floods which would otherwise result.

20. In recent years more logs are brought to Ontonagon by rail, on logging roads, and fewer by the river. Formerly from 60,000,000,to 100,000,000 feet of logs were floated down the river each spring, whereas now there are but 6,000,000 or 7,000,000 feet. This gives the flood currents, with their scouring effects, access to the channel.

21. The logs were hauled to the river in the winter and left lying upon the ice. In the following spring, as soon as the ice began to move, the logs floated down the river, and were stopped at the jam piers, where they began at once to accumulate and jam in together and fill up the channel. A little later with the melting of the snow would come the usual spring flood, which spread over the adjoining lands as stated. The logs were all taken out of the jam during the season, to be either sawed, rafted away, or hauled to Green Bay by rail. This opened up the river, but by that time the water was low and no scouring could then occur.

22. There is some plausibility in Mr. Holahan's explanation of the recent shoaling, and it may possibly be the correct one. The information at hand, however, is not in my opinion sufficient to confirm this conclusively. Mr. Coe, of this office, who examined a portion of the river in August of this year says—

> On the bank, in many places, sand is deposited 5 and 6 feet above the water level, doubtless from overflows.
>
> This shifting sand is pretty much the same nature throughout, yellowish, and I judge that most of it would pass through a No. 40 sieve. The inspectors of dredging stated that the material dredged was entirely of this nature.

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23. The sand deposits observed by Mr. Coe may have been caused by the presence of logs in the river at some time under the conditions mentioned by Mr. Holahan, but not necessarily so, as ordinary overflows in high floods might cause such deposits.

24. The floating of logs in a river is known to abrade the banks and beds of the channel, and a jam of logs might cause abnormal scouring in spots and deposits of unstable sand bars both in the bed and on the low flats. The cessation of logging operations might then be expected to result in increased scouring by the cutting away of these irregularities, until the normal régime of the channel was restored, after which a lessening of the scour would follow.

25. The floating of logs on the river will be done to a less extent hereafter, and eventually must practically cease. The amount of shoaling in the harbor of Ontonagon which will then obtain can not be predicted with certainty, but I venture to say that it will not "grow worse as time goes on."

26. Of the recent shoaling it may further be said that in 1905 and 1906 there was only moderately high water in the river, and the shoaling, though more than usual, was not extraordinary. The dredging by the Government to remove shoals in 1905 was 36,310 yards, and in 1906 was 23,937 yards. The greatest shoaling was in the present year, 1907, requiring the removal of 70,000 yards, and the latter shoaling was caused by a flood which Mr. James Corgan, of Ontonagon, states was not of remarkable height, but was the most prolonged flood which he had known since 1892. The discharge at one time during this flood (May 14, 1907), as determined by this office, was about 16,000 cubic feet a second, and this was probably about its maximum. We have no record of the greatest floods on this river.

27. *Commerce, present and prospective.*—The shipments and receipts by vessels and of logs in rafts for the last thirteen years for this port are shown in a table herewith.

Ontonagon commerce for the thirteen years 1894 to 1906, inclusive.

Year.	Freight received and shipped.[a]	Value of freight.[a]	Logs received and shipped.	Value of logs.
	Tons.		*Feet.*	
1906	21,411	$797,047	8,650,000	$129,750
1905	30,506	1,043,181	8,025,000	104,325
1904	16,900	894,500	1,000,000	12,000
1903	7,990	495,070	2,400,000	28,800
1902	5,735	416,434	3,750,000	46,875
1901	4,284	719,795	2,665,000	29,315
1900	7,352	1,236,136	1,300,000	14,300
1899	8,218	1,321,480	1,550,000	17,050
1898	2,158	156,715	4,565,000	50,215
1897[b]				
1896[b]				
1895	101,050	400,665	26,666,667	266,667
1894	82,790	925,550	33,333,333	333,333
Total	288,403	8,405,573	93,905,000	1,032,630

[a] Exclusive of logs. [b] No reports.

28. The total vessel freight from commencement of improvement of the harbor by the United States in 1867 to January 1, 1907, was 2,787,671 tons of 2,000 pounds, and the estimated value of same is

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$74,766,002. The total amount expended by the United States for improvement and maintenance to June 30, 1907, was $363,525.52. This last sum is one-half of 1 per cent of the value of the vessel freight for the same period.

29. The estimated saving in cost of transportation by water over that by rail is $1.79 per ton, or $38,325 for the lake commerce of this port for the one year 1906.

30. The village of Ontonagon was almost completely destroyed by fire in August, 1896, and business practically ceased for a few years, but has since recovered to a great extent. Most of this growth has been in the last three years, as will be seen from the foregoing figures.

31. *Lumber.*—The main item in the commerce of this harbor is the manufacture and shipment of lumber and the rafting of logs to other points on the lake. The lumber shipments by vessel comprise 83 per cent of the entire freight tonnage of this port.

32. As to future lumber shipments, it may be stated that there is a large amount of standing timber tributary to Ontonagon Harbor, consisting of white and Norway pine, hemlock, elm, ash, and maple—a mixed timber. Much of the northerly and northwesterly portions of Ontonagon County is virgin forest. The amount of this timber has been estimated at from 1,000,000,000 to 1,750,000,000 feet.

33. While some of these logs will be rafted to other points and some hauled by rail to be sawed elsewhere, yet, judging from the past, most of them will continue to be sawed at Ontonagon. While part of the resulting lumber will be shipped by rail to interior points, yet most of it will be shipped by vessels. It is probable that the lumber business at Ontonagon will continue for the next twenty years. Possibly three-fourths of a billion feet of lumber will be shipped from Ontonagon by vessels before the supply of timber is exhausted. This amount at present prices would be worth something like $15,000,000. Its actual value is likely to be much greater, as the price of lumber is advancing with the growing scarcity, and must continue to do so.

34. *Copper mining.*—There is a belt of copper mineral in Ontonagon County, and four mines are now in operation, located from 12 to 60 miles from Ontonagon. Some of these mining companies probably would have built their stamp mills at or near Ontonagon and received supplies and shipped the metal from this port if the harbor had been deeper and more permanent, as stated in some of the accompanying letters,[a] and this would have added to the commerce of this port. These stamp mills are now located elsewhere and of course lost to the harbor of Ontonagon.

35. The copper mines of Ontonagon County are, however, generally speaking, not very rich in ore nor very profitable to the companies operating them. They are not paying dividends, and the market price of the stocks is very low. With the value of copper at a normal basis, which would be some cents below the present price, some of these mines would probably have to shut down. One of the companies, however (the Michigan), is in a fair way to pay dividends in a few years unless the price of copper goes too low, and there have recently been some promising discoveries of copper in another locality of this region by the Lake Copper Mining Company.

[a] Not printed.

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36. To provide a harbor for the larger class of vessels might gain business from the mines by making the harbor a base of supplies and shipments for some of them, and this would also tend to develop other enterprises, such as sawmills and factories. But to make such a harbor with a depth sufficient for vessels drawing 20 feet would mean more than a diversion of the river channel. The entrance piers would need to be extended into deeper water than at present and the inner harbor basin enlarged, and it might be necessary to build new entrance piers, and also a breakwater.

37. *Harbor of refuge.*—As a harbor of refuge Ontonagon affords a convenient shelter to coasting steamers, tugs, lumber steamers and barges, and other small and medium class vessels, it being the only harbor in the hundred-mile stretch of coast line between the Portage Lake Canal and the Apostle Islands. The larger vessels, of course, can not enter, and it is very seldom that they would wish to if they could, as Ontonagon is from 15 to 35 miles off their courses and they would be able to reach either the Apostle Islands or the Portage Canal in any storm likely to overtake them while running in that part of the lake.

38. On this subject attention is invited to a report by Capt. D. D. Gaillard, Corps of Engineers, on a preliminary survey made by him, dated January 17, 1903, and printed in House Document No. 235, Fifty-eighth Congress, second session, and at page 2796 of the Annual Report of the Chief of Engineers for 1904.

39. *Diversion of Ontonagon River.*—To prevent shoaling in the harbor, it has been proposed to turn the river from its present course by building a dam across the present channel a mile or so above the harbor. The new channel thus secured would be through low ground and sand ridges of moderate height, somewhere to the west of the village, and would discharge into the lake about 1 mile from its present outlet. The idea is to shut off the river discharge from the harbor, and thus stop the deposits which the river brings down.

40. Such a project would, in my opinion, be a feasible one from the engineering point of view, and it is believed would present no engineering difficulties.

41. As to the query raised in the river and harbor act, "whether a change in the course of the Ontonagon River may not aid in maintaining the harbor," the answer must be in the affirmative. It would undoubtedly assist in maintaining the harbor, by doing away with river deposits, which cause most of the shoaling, and leave only such shoals or bars as might be formed by wave action in the lake approach and for a short distance within the piers.

42. Whether or not it would be expedient to change the course of the river, considering cost among other things, is another question. If the existence of the harbor depended upon it, such a change might possibly be justified, there being a considerable amount of business tributary to this harbor, as already stated. This would have to be determined by a careful balancing of cost against benefits.

43. However, there remains the former recourse of dredging to keep the harbor open, and I am of the opinion that rather than go to the expense of changing the course of the river, it would be better for the Government to provide sufficient funds for dredging out shoals more completely and effectually than has been done in the past by excavating to a greater depth and width.

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44. In my annual report to the Chief of Engineers for 1907, and in the report of my predecessor, Major Potter, for 1906 is a suggestion which may be repeated here, as follows:

It is believed that the best results can be obtained by making a sufficient appropriation at one time to thoroughly dredge the area between the piers and up to the two docks, and then provide a sum for maintenance sufficient to dredge out the results of at least two bad floods and keep this on hand until a bad season should occur. The dredging should be generally to a depth of 16 feet, in order to insure the project depth of 12 feet.

45. I would add to the foregoing only by saying that the present necessities of commerce at this port, which is mainly the shipment of lumber, require a greater depth than 12 feet, and that in my opinion the existing project should be modified so as to increase this depth to 15 feet at low water, and also that the dredging should be done to enough greater depth than 15 feet to provide a reasonable margin for shoaling.

46. A preliminary study of plans and cost for the proposed change in the river indicates that the annual charge against it for interest on cost of construction and for maintenance would much more than pay for the dredging outlined above and recommended.

47. In view of what precedes, I am of the opinion that it is not advisable for the United States to undertake the proposed change in the course of the Ontonagon River.

Very respectfully,

GRAHAM D. FITCH,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[Fifth indorsement.]

OFFICE DIVISION ENGINEER, NORTHWEST DIVISION
Chicago, Ill., October 19, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

I concur in the views of Major Fitch as expressed by him in paragraphs 43–47 of his report of September 14, 1907.

W. H. BIXBY,
Lieut. Col., Corps of Engineers,
Division Engineer, Northwest Division.

[Seventh indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., October 28, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

The entrance to Ontonagon River, which forms the harbor, has been under improvement by the United States since 1867, at which time a project for securing a depth of 12 feet by means of parallel piers and dredging between them was adopted. The project was practically completed in 1889, since which time some repairs have been made to the piers and occasional dredging has been done between them. The project dimensions were fairly well maintained for about fifteen years at moderate cost. To June 30, 1906, $363,000 had been expended on the improvement, of which

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sum $78,200 had been used for maintenance. Since 1903 the shoaling within the harbor has been very much greater than prior to that time, and the appropriations have not been sufficient to maintain the projected depth, on account of which navigation interests have suffered considerably.

The Ontonagon River brings down in time of flood large quantities of material which is deposited in the slack water in the harbor, and this is the source of the difficulty in maintaining a fairly good channel through the entrance. It has been manifest for the past three years that unless considerably larger sums were made available a reliable channel could not be depended upon, and it was probably with a view to securing more stable conditions that the present examination "to determine whether a change in the course of the Ontonagon River may not aid in maintaining the harbor" was authorized. The plan contemplated is one of diversion, it being proposed to dam the river above the town of Ontonagon and dredge a channel from above the dam to the lake shore, a mile or so from the present entrance, the new channel to carry the discharge of the river with its burden of sediment through the new outlet. The only filling of consequence that would then take place in the harbor would be from the drift of sand at the entrance.

As stated by the district officer, the question as to whether a change in the course of the river may not aid in maintaining the harbor must be answered in the affirmative, for such a change would undoubtedly result in less filling in the harbor. It appears that the plan is entirely practical from an engineering point of view, and the advisability of adopting it therefore naturally hinges upon the question of its cost, when compared with the resulting benefits, and with the cost of maintaining the harbor by the present means of dredging.

While the cost of the diversion scheme is not definitely known, it would undoubtedly be considerable. The district officer states that a preliminary study indicates that the annual charge against it for interest on the cost of construction and for maintenance would much more than pay for dredging under the present plan.

In view of the foregoing, it is the opinion of the Board, concurring with the district officer and the division engineer, that it is not advisable at this time for the United States to undertake the improvement of Ontonagon Harbor by changing the course of the river.

For the Board

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 445.

WATERWAY CONNECTING SWAN QUARTER BAY WITH DEEP BAY, NORTH CAROLINA.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION, WITH PLAN AND ESTIMATE OF COST OF IMPROVEMENT, OF WATERWAY CONNECTING SWAN QUARTER BAY WITH DEEP BAY, NORTH CAROLINA.

JANUARY 6, 1908.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 26, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated 24th instant, together with copies of reports from Capt. Earl I. Brown, Corps of Engineers, dated August 22 and September 26, 1907, of a preliminary examination, with plan and estimate of cost of improvement, of waterway connecting Swan Quarter Bay with Deep Bay, North Carolina, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

WM. H. TAFT,
Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 24, 1907.

SIR: I have the honor to submit herewith, for transmission to Congress, reports of August 22, 1907, and September 26, 1907, by Capt. Earl I. Brown, Corps of Engineers, on preliminary examination, with plan and estimate of cost of improvement, authorized by the river and

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harbor act approved March 2, 1907, of waterway connecting Swan Quarter Bay with Deep Bay, North Carolina, with a view to obtaining a depth of 6, 7, and 8 feet, respectively.

Estimates are submitted of the cost of obtaining and maintaining channels of the various depths named in the act. The depth recommended is 6 feet, at an estimated first cost of $14,575, with $900 annually for maintenance after completion.

I concur in the opinion of the district officer, the division engineer, and the Board of Engineers for Rivers and Harbors that this locality is worthy of improvement by the General Government to the extent indicated above.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF WATERWAY CONNECTING SWAN QUARTER BAY WITH DEEP BAY, NORTH CAROLINA.

WAR DEPARTMENT,
UNITED STATES ENGINEER OFFICE,
Wilmington, N. C., August 22, 1907.

GENERAL: I have the honor to submit the following report of a preliminary examination of waterway connecting Swan Quarter Bay with Deep Bay, North Carolina, made pursuant to the following clause of the river and harbor act approved March 2, 1907:

Waterway connecting Swan Quarter Bay with Deep Bay, with a view to obtaining a depth of six, seven, and eight feet, respectively.

The duty of making this examination was assigned to the officer in charge of this district on March 14, 1907.

Swan Quarter, the county seat of Hyde County, N. C., is situated at the head of Swan Quarter Bay, in the southwestern part of the county, and on the north shore of Pamlico Sound, near the mouth of the Pamlico River. Just to the westward of Swan Quarter Bay, and separated from it by the low marshes known as Judith Marshes and Judith Island, is a small landlocked harbor, called Deep Bay. This opens into Rose Bay, and the latter into the Pamlico River a few miles above its mouth.

The nearest large cities and railroad stations to Swan Quarter are Washington, 50 miles distant, on the Pamlico River, and Belhaven, 30 miles distant, on the Pungo River, a tributary of the Pamlico, traffic to both places having to ascend the Pamlico River.

A reference to the inclosed sketch[a] will show at a glance the great saving in distance that could be made from Swan Quarter to any point on the Pamlico River if there were any means of communciation across the narrow isthmus connecting the mainland with the outlying marshes. The importance of this short cut early led to attempts to make an artificial cut through the isthmus by raking the mud to one side with oyster dredges. In this manner a shallow canal was cut across and has been improved from time to time until there now exists a canal ranging in width from 25 to 100 feet, and 2 to 6 feet deep at mean stage of the water.

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[a] Not printed.

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The mere saving of distance, however, is not the principal consideration of the people of Hyde County in asking that this improvement be made. The principal consideration is that certainty of being able to run their boats in all kinds of weather be assured. In stormy weather, boats attempting to run from Swan Quarter to Pamlico River have to come down Swan Quarter Bay, and through Pamlico Sound around Shell Point into the river. They are thus exposed to the heavy southwest winds and seas so prevalent here, rendering the trip quite dangerous at such times for the small boats necessarily used in this trade. It will be noted by reference to the above-mentioned sketch that the route from Swan Quarter Bay to Pamlico River, through the canal or waterway and Deep Bay, is entirely protected, and traffic would be possible without any interruption, except from most unusual causes.

The trade from Swan Quarter Bay to Pamlico River is not the only trade that would be benefited by this improvement. There are also some flourishing settlements on Juniper Bay, just to the eastward of Swan Quarter Bay, and its traffic is also with the same points as that of Swan Quarter Bay. The Juniper Bay trade has an even more exposed route to follow than that of Swan Quarter. It follows the route from Juniper Bay through the narrows between Great Island and the mainland, where it is well protected, thence through Pamlico Sound to the river. If, on leaving the narrows, the boats could ascend Swan Quarter Bay and go through the proposed route, they would be well protected the entire distance except at the entrance to Juniper Bay.

The commerce between Swan Quarter and Washington and Belhaven for the year ending December 31, 1906, was as follows:

Commodity.	Tons.	Price.	Value.
Fertilizer	500	$22	$11,000
Cotton seed	300	25	7,500
Cotton	187.5	210	39,375
Building material	500	10	5,000
Corn	600	35	21,000
Potatoes	2,000	20	40,000
Eggs	25	300	7,500
Chickens	60	200	12,000
Cattle	140	60	8,400
General merchandise	600	140	84,000
Fish	25	60	900
Oysters	2,000	35	70,000
Total	6,937.5	.....	306,675

That for the same year from Juniper Bay, which would also be benefited by the improvement, was as follows:

Commodity.	Tons.	Price.	Value.
Fertilizer	500	$22	$11,000
Building material	200	10	2,000
Corn	750	35	26,250
Potatoes	1,600	20	32,000
Eggs	10	300	3,000
Chickens	24	200	4,800
General merchandise	200	140	28,000
Cattle	84	60	5,040
Fish	10	60	600
Lime	25	10	250
Total	3,403	.....	112,940

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In addition to the above, Swan Quarter Bay is a natural harbor for a majority of the vessels engaged in the oyster business, which, during the proper season, is very extensive on Pamlico Sound. It is stated that during the season, in bad weather and on Sundays, as many as 50 or 60 of these craft—of an average tonnage capacity of 10 tons—anchor in the bay and would be able, if loaded, to go to their markets at Washington and Belhaven in spite of stormy weather, if this canal were large enough to pass them.

There are five sail vessels with tonnage capacity of from 15 to 25 tons that trade regularly from Swan Quarter to Washington and Belhaven, and one power boat, of 30 tons, that makes irregular trips over the same routes. There are two vessels of 18 to 30 tons that trade regularly between Juniper Bay and Pamlico River, and a host of smaller vessels that ply irregularly on the two bays.

The population of Swan Quarter Township is about 2,000, and of the town about 250.

Practically everything brought out of or carried into the township is transported over this route.

The distance from Swan Quarter Bay across the marshy isthmus to Deep Bay, via the present cut, is about one-half mile.

The cost of this improvement would be small.

A depth of 6 feet will be ample to accommodate traffic through the canal for many years.

I believe that it is worthy of improvement to this extent, but not to a greater depth.

Sufficient data are now at hand to prepare plans and estimate the cost of the improvement without any further survey.

Respectfully submitted.

EARL I. BROWN,
Captain, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

OFFICE OF DIVISION ENGINEER, SOUTHEAST DIVISION,
Savannah, Ga., August 25, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army.

This improvement would seem to be a worthy one if it can be accomplished at moderate cost, and I would respectfully recommend that the district officer be authorized to prepare a plan and estimate for further consideration.

DAN C. KINGMAN,
Lieut. Col., Corps of Engineers,
Division Engineer, Southeast Division.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., September 3, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

This is a locality of which no previous examination has been ordered by Congress. The population of the tributary country interested in the proposed improvement is stated to be about 2,000.

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There being no railroad facilities within about 25 miles, the community is entirely dependent upon water transportation, which must necessarily be carried on by light-draft vessels unsuited for navigation in rough weather in the open waters of Pamlico Sound, the present route to Washington or Belhaven, the nearest railroad towns.

The improvement desired is a cut through a marshy neck between Swan Quarter Bay and Deep Bay, by which the distance to points on Pamlico Sound will be greatly lessened and a much more sheltered and safe route provided. It appears that a shallow and crooked cut has already been made by those interested, but that it does not afford adequate facilities.

The commerce involved is reported to amount to about 10,000 tons, valued at about $419,000. The district officer believes the locality worthy of improvement to the extent of a channel 6 feet in depth, and states that an estimate of cost can be prepared from data at hand without a survey. The division engineer recommends that an estimate be made.

In the opinion of the Board the interests concerned are of sufficient extent and importance to warrant a moderate expenditure by the General Government, with a view to affording better navigation facilities. It appears that a depth of 6 feet will meet all reasonable demands of commerce, and therefore it is recommended that an estimate of cost of a channel of that depth be authorized.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

[Fourth indorsement.]

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, September 7, 1907.

Respectfully submitted to the Secretary of War.

This is a report on preliminary examination of waterway connecting Swan Quarter Bay with Deep Bay, North Carolina, authorized by the river and harbor act of March 2, 1907.

Inviting attention to the report of the Board of Engineers for Rivers and Harbors, in the preceding indorsement, I recommend that preparation of plan and estimate of cost of improvement of the locality, as proposed, be authorized.

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

[Fifth indorsement.]

WAR DEPARTMENT,
September 9, 1907.

Approved as recommended by the Chief of Engineers in the preceding indorsement.

ROBERT SHAW OLIVER,
Acting Secretary of War.

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PLAN AND ESTIMATE OF COST OF IMPROVEMENT OF WATERWAY CONNECTING SWAN QUARTER BAY WITH DEEP BAY, NORTH CAROLINA.

WAR DEPARTMENT,
UNITED STATES ENGINEER OFFICE,
Wilmington, N. C., September 26, 1907

GENERAL: In compliance with instructions contained in Department letter dated September 11, 1907, I have the honor to submit the following plans and estimates of cost for improving waterway connecting Swan Quarter Bay with Deep Bay, North Carolina, to the depths of 6, 7, and 8 feet, respectively.

The existing waterway from Swan Quarter Bay to Deep Bay is a crescent-shaped artificial canal 0.6 of a mile long through the marshes separating Deep Bay from Swan Quarter Bay. It varies in depth from 2 to 7 feet and in width from 25 to 150 feet. The banks are low and marshy, but fairly stable. Its bottom is mud, probably underlaid by sand, as the bottoms of both bays are of broken shell and sand. The tidal currents through the waterway will probably be gentle, since lunar tides in this part of Pamlico Sound are very small. Most of the tidal variations are due to wind.

Estimates are made on a basis of 50 feet bottom width of channel, with side slopes of 1 on 1. An allowance of 1 foot is made for over depth. In the narrow part of the cut the dredged material will be deposited on the banks. In the open bay it will be removed in scows and dumped. Allowance is made for retaining the dredged material on the banks by sheet piling in case it has a tendency to flow. The length of the cut to obtain a 6-foot channel will be 5,500 feet, for a 7-foot channel, 6,750 feet, and for an 8-foot channel, 10,000 feet.

The cost of this proposed work is as follows:

	Depth of channel.		
	Six feet.	Seven feet.	Eight feet.
Number cubic yards to be dredged	53,000	71,000	99,000
Unit cost	$0.25	$0.25	$0 25
Amount	$13,250	$17,750	$24,750
Superintendence and contingencies	1,325	1,775	2,475
Total	14,575	19,525	27,225
Annual cost of maintenance	900	1,500	2,000

Considering the fact that this waterway is not designed to open up a new route of communication, but to afford a short and protected route for small craft, and that the boats which ply on these waters range in draft from 2 to 6 feet, it is my opinion that improvement to an extent beyond 6 feet is not justified by the needs of the community. If boats of a greater draft should be used in the trade here, they have a deep-water route out through Pamlico Sound and Pamlico River to the markets of Washington and Belhaven, which are the places with which most trade is carried on. These larger boats would be heavy enough to weather all ordinary seas on Pamlico Sound and not to

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need a protected route, although it would undoubtedly be a great convenience to them.

I believe, however, that the commerce of Swan Quarter and Deep Bay is sufficiently large and would be benefited sufficiently by a 6-foot depth to justify the adoption of the 6-foot project.

Respectfully submitted.

EARL I. BROWN,
Captain, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

OFFICE OF DIVISION ENGINEER, SOUTHEAST DIVISION,
Savannah, Ga., September 26, 1907.

Respectfully submitted to the Chief of Engineers, U. S. Army.

I am of the opinion that an improvement to afford a depth of 6 feet would be justifiable.

DAN C. KINGMAN,
Lieut. Col., Corps of Engineers,
Division Engineer, Southeast Division.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., October 7, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

The district officer submits estimates for channels of 6, 7, and 8 feet in depth, amounting to $14,575, $19,525, and $27,225, respectively, with estimates for maintenance of $900, $1,500, and $2,000, respectively. He believes the commerce involved is sufficiently large to justify the cost of a 6-foot channel and that this depth will meet the demands of navigation, in which views the division engineer concurs.

In the opinion of the Board the present commerce of 10,000 tons, which is dependent entirely upon water transportation, with reasonable prospects for an increase, warrants the expense necessary to provide the protected 6-foot channel contemplated, and no greater depth is now required. It therefore recommends the adoption of the project proposed by the district officer at an initial cost of $14,575, and $900 annually thereafter for maintenance.

For the Board:

R. L. HOXIE,
Colonel, Corps of Engineers,
Senior Member Present.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 446.

QUEENS CREEK, VIRGINIA.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF QUEENS CREEK, VIRGINIA, FROM ITS MOUTH TO CAPITAL LANDING BRIDGE.

JANUARY 6, 1908.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 26, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated 23d instant, together with copy of a report from Maj. Spencer Cosby, Corps of Engineers, dated August 2, 1907, of a preliminary examination of Queens Creek, Virginia, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

WM. H. TAFT,
Secretary of War.

THE SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 23, 1907.

SIR: I have the honor to submit herewith, for transmission to Congress, report of August 2, 1907, by Maj. Spencer Cosby, Corps of Engineers, on preliminary examination authorized by the river and harbor act approved March 2, 1907, of Queens Creek, Virginia, with a view to obtaining a channel from its mouth to Capital Landing bridge.

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From the facts and for the reasons given I concur in the opinion of the district officer, the division engineer, and the Board of Engineers for Rivers and Harbors that this locality is not worthy of improvement by the General Government.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF QUEENS CREEK, VIRGINIA, FROM ITS MOUTH TO CAPITAL LANDING BRIDGE.

UNITED STATES ENGINEER OFFICE,
Washington, D. C., August 2, 1907.

GENERAL: In accordance with instructions from the Chief of Engineers, I have the honer to submit the following report of a preliminary examination of "Queens Creek, with a view to obtaining a channel from its mouth to Capital Landing bridge," made in compliance with the requirements of the river and harbor act of March 2, 1907.

The examination was made April 29, 1907, by Mr. F. C. Warman, assistant engineer, and was preceded by a hearing which had been previously announced by means of notices posted in prominent places and by letters to interested parties. Fifteen persons were present. The quotations introduced below are from Mr. Warman's report of the examination.

GENERAL DESCRIPTION OF LOCALITY.

Queens Creek is a small stream about 10 miles long, located wholly within the limits of York County, Va. From its source it flows in a general southeasterly direction for about 5 miles, when it is crossed by Capital Landing bridge, on the main road from Williamsburg to the town of Magruder. At the bridge the direction of the creek changes, and it flows more directly to the east until it empties into York River from its right (western) bank at a point 14 miles above the mouth of the river. The bridge is without a draw, and the 5 miles stretch of Queens Creek below it is therefore the only portion of the stream now capable of being made navigable. This is the portion referred to in the act, and to it the examination was limited. There is no request for improvement of the stream above.

The portion of the creek below Capital Landing bridge is mainly bordered by marshes, though the firm land touches its banks at intervals, and back from the creek the land is gently undulating. The width of the creek is but 60 or 70 feet at the bridge and it gradually expands to a width of 400 or 500 feet at its mouth. The greatest depth observed in the creek was 12 feet at low tide. Tides rise to a mill dam about 1 mile above the bridge and the mean range of tides is about 3 feet. Owing to the contracted watershed the freshet effects are usually slight, though considerable earth is said to be washed into the stream from adjacent cultivated areas, and the shoaling from this source has been marked in recent years.

The right shore of the York River is separated from the channel by a wide mud flat, and there are no wharves on that side of the river above Yorktown, 12 miles from Williamsburg and 8 miles below the mouth of the creek. Consequently a considerable area of the peninsula between the York and James rivers might find a water outlet for its commerce by way of Queens Creek were that

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stream made more easily navigable. Its improvement to accommodate deep-draft steamers, however, would be very expensive and is not requested at the present time by the interested parties.

The principal settlements in the tributary area are Williamsburg, the old colonial capital of Virginia and now a flourishing town of about 2,500 inhabitants; Magruder, with a population of about 500, and Fort Magruder, with about 200. The total population of this area is estimated at from 3,700 to 4,000. The distance from Williamsburg to Capital Landing bridge is a little less than 1½ miles, while the distance from Jamestown, the most accessible landing on the James River at which steamers regularly stop, to the city is 9 miles. An excellent new road has just been completed between these two points.

The residents of this locality are largely engaged in agricultural and lumbering pursuits, and there are included in this territory 6 sawmills, a planing mill, a knitting mill, and about 40 stores. The soil is said to be excellent for truck farming; the roads are generally fair.

There are six or seven "landings" for small boats on the creek. These landings usually consist of a mound of shells alongside which the boats lie. There is a small timber wharf built on piles, belonging to the city of Williamsburg, just below the bridge. The nearest wharf at which regular lines of steamers stop is Claybank, over 3 miles from the mouth of Queens Creek and on the opposite side of York River.

Good transportation facilities are, however, afforded by the main line of the Chesapeake and Ohio Railway, which passes through Williamsburg. The distance by rail to Newport News is 27 miles and to Richmond 48 miles.

OBSTRUCTIONS TO NAVIGATION.

The obstructions to navigation in order as they are encountered in descending the stream from Capital Landing bridge are as follows:

Beginning just below the bridge there is a shoal which extends downstream for a mile to a mile and a half and has a depth over it of from 1½ to 4 feet at low tide. The material composing this bar is black mud mixed with sand. The bar is probably formed by deposits from freshets which are first checked at this point by the tides and slight expansion of the stream. It has been in process of formation for many years.

From this point down to Haw Tree shoal the depth generally ranges from 5 to 8 feet, though there are several short shoal places over which the depth is but 3 to 4 feet.

Haw Tree shoal is located near Haw Tree Landing, about 2 miles below the bridge. This is a mud bar about 1,000 feet long with a ruling depth of about 2 feet at low tide. The primary cause of the shoal is said to be the wreck of a vessel which sank in the channel at this point about fourteen years ago and checked the current below it.

From this shoal down to Morris Point the depth generally ranges from 6 to 10 feet.

At Morris Point, about 4½ miles below the bridge, the channel, though of ample depth, is narrow and crooked. The depth is about 12 feet and the width but 20 feet. The channel should be widened and rectified for a length of about 500 feet at this point. The material to be dredged is mud.

The bar at the mouth of the creek begins in the last reach of the creek and extends across an extensive soft mud flat to the channel of York River. The total length of this shoal is about 1 mile and the depth over it is generally about 2½ feet at low tide.

PREVIOUS IMPROVEMENT.

As far as known no work of improvement has ever been done upon this stream either at public or private expense, and no previous examination or survey with a view to its improvement has been made

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In 1881 and 1882, $10,000 altogether was appropriated for the improvement of Archers Hope River (otherwise known as College Creek), which is a tributary of James River, and which is about the same distance to the south of Williamsburg that Queens Creek is to the north. This sum was expended in dredging a channel 6 feet deep and 50 feet wide partly through the bar at the entrance of the stream into James River. No further appropriations were made. The work done was reported to have been of little benefit to commerce, and the channel obtained, being unprotected, was soon practically obliterated, according to information obtained at Williamsburg. It is probable, however, that it would cost less to obtain a 6-foot channel in this stream than in Queens Creek.

IMPROVEMENT DESIRED.

The improvement of Queens Creek now requested is the dredging and maintenance of a channel 50 feet wide and 6 feet deep at low tide from deep water in York River to Capital Landing bridge, with a turning basin 100 feet wide at the upper landing. To make such an improvement at all permanent would necessitate the construction of a long and expensive dike for the protection of the channel across the soft mud flat in York River, or else frequent redredging would be required; it would also be necessary to purchase land for the turning basin site. It was, however, stated at the hearing that if a draft of 6 feet can not be provided a channel 4 feet deep would be of considerable assistance to shippers. There are several wrecks in the stream that should be removed.

PAST AND PRESENT COMMERCE.

Up to about fourteen years ago a small steam packet drawing about 6 feet navigated Queens Creek, but since that time it has been discontinued, owing to the shoaling of the stream and to increased shipments by the railroad, which was completed through this section of the country in 1881.

At the time the packet was in operation shipments were made largely to Baltimore, where the merchants of Williamsburg and vicinity purchased most of their goods.

At the present time the shipments on Queens Creek are insignificant and consist of a small amount of lumber, railroad ties, cord wood, fish, and oysters. No estimate of the tonnage or value of these shipments was obtainable, though requested both verbally and by letter. Most of the shipments are now made by rail to and from Norfolk, Newport News, Old Point Comfort, and Richmond. Some of the articles are transshipped at Old Point to Baltimore, New York, and Philadelphia. A few small sailing vessels ascend Queens Creek to Blaines Landing, 1½ miles above its mouth, and gasoline launches run up to Capital Landing bridge. By means of these boats a small amount of produce and some passengers are carried across York River to the steamboat wharves on the left bank.

The raising of market-garden produce is handicapped by lack of facilities for shipment, and it is stated that such produce often lies over for twenty-four hours at Old Point awaiting transshipment and is consequently in bad condition when received at its destination.

It is stated that the railroad rates have been raised about 15 per cent since the packet line was abandoned and that water rates in this locality are 25 to 50 per cent lower than rail rates. Actual comparative figures, though requested, could not be obtained.

Six gasoline launches and two small sailing vessels belong in Queens Creek.

PROSPECTIVE COMMERCE AND BENEFITS.

The improvement contemplated is so small that no regular lines of steamers or large sailing craft could utilize the channel which would be provided (nor is it regarded as practicable to provide a channel of greater dimensions than those asked for).

If the stream were improved as desired by the residents, some lumber, wood, forest products, and grain would doubtless be shipped by small vessels, but the main

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advantage anticipated from the improvement is the establishment of a regular line of launches and small sailing craft connecting the wharves on Queens Creek with the Baltimore steamers in York River.

It is claimed that this would result in greatly developing the trucking interests of this section, in enabling merchants to ship bulky articles by water, and in a general reduction of freight rates, not only in articles actually shipped by water, but, owing to the competition, of railroad rates as well.

It does not seem likely that the number of passengers visiting this historic locality would be materially increased by the improvement of Queens Creek, although some parties interested in the work make the assertion that it would.

CONCLUSIONS.

While some of the anticipated advantages might be realized from the improvement of this stream, the work suggested is so purely local in character, the benefits to be derived are so slight, and the expense of maintaining the channel, either by constructing a dike in York River or by frequent redredging, would probably be so great in proportion to the commerce that Queens Creek is not regarded as being worthy of improvement by the General Government. The railroad now passing through this section affords a good if not entirely satisfactory means of transportation, and even if the stream were improved would undoubtedly continue to carry the great bulk of the shipments.

The estimated cost of a survey of the locality, should one be desired, is $500.

Very respectfully,

SPENCER COSBY,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

UNITED STATES ENGINEER OFFICE, EASTERN DIVISION,
New York City, August 3, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army, concurring in the views of the district officer that Queens Creek is unworthy of improvement by the General Government.

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Division Engineer.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., August 26, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

Queens Creek is a tributary of York River, which it enters from the west at a point 14 miles above the mouth of the river. The length of the creek is about 10 miles, but under existing conditions the lower 5 miles of the stream is the only portion capable of being made navigable on account of the presence of Capital Landing bridge, which is without a draw. There is no request for improvement above the bridge, but that desired below is the dredging and maintenance of a channel 50 feet wide and 6 feet deep at low tide, from deep water

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in York River to the bridge, with a turning basin 100 feet wide at the upper landing.

This is a stream of which no previous preliminary examinations or surveys have been made. The within report of the district officer, however, is complete and comprehensive, both as to the physical characteristics of the stream and the surrounding country, and as to the commercial development of the locality. It is stated that if the stream were improved as desired by the residents some lumber, wood, forest products, and grain would doubtless be shipped by small vessels, but the main advantage anticipated from the improvement is the establishment of a regular line of launches and small sailing craft connecting the wharves on Queens Creek with the Baltimore steamers in York River, the proposed channel being too small to admit these steamers into the creek. Interested persons claim that the improvement would result in greatly developing the trucking interests of this section, in enabling merchants to ship bulky articles by water, and in a general reduction of freight rates, not only in articles actually shipped by water but of railroad rates as well.

While some of the predicted advantages might result from the work, the benefits would be local in character and limited in extent. Owing to the small length of that part of the creek which can be made navigable, its usefulness would necessarily be confined to a correspondingly small territory. Good rail transportation facilities are afforded by a line passing through Williamsburg, and as the peninsula separating James River and York River is only about 8 to 10 miles wide at this locality, suitable landings can be constructed on these rivers when the commerce becomes of sufficient importance to justify the expense.

In communications addressed to the Board, interested parties request that, if the improvement first advocated by them be considered inadvisable, a lesser improvement, involving the removal of obstructing wrecks, the dredging of shoals, and the opening of a channel through the mud flats at the mouth, be undertaken. It is apparent that the extensive mud flat at the mouth, which has a length of about 1 mile and a depth of about 2½ feet at low tide, controls the navigation of the stream. To maintain a channel through this flat would necessitate the construction of a long and expensive dike, or frequent dredging operations.

It is obvious that any improvement to be of benefit to the community must provide for a suitable entrance through this flat, and in the opinion of the Board it is therefore impracticable to undertake an inexpensive improvement of this stream which will be of commensurate value to commerce.

In view of the probable cost of any adequate improvement, when compared with its limited commercial utility, the Board concurs with the district officer and the division engineer in the opinion that it is not advisable for the United States to undertake the improvement of Queens Creek at the present time.

For the Board:

D. W. Lockwood,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 447.

PETERS NECK POINT THROUGH LONG BEACH BAY TO HORN RIVER, NEW YORK.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF CHANNEL FROM PETERS NECK POINT THROUGH LONG BEACH BAY TO HORN RIVER, NEW YORK.

JANUARY 6, 1908.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 26, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated 23d instant, together with copy of a report from Col. John G. D. Knight, Corps of Engineers, dated August 30, 1907, of a preliminary examination of channel from Peters Neck Point through Long Beach Bay to Horn River, New York, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

WM. H. TAFT,
Secretary of War.

THE SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 23, 1907.

SIR: I have the honor to submit herewith, for transmission to Congress, report of August 30, 1907, by Col. John G. D. Knight, Corps of Engineers, on preliminary examination authorized by the river and harbor act approved March 2, 1907, of channel from Peters Neck Point through Long Beach Bay to Horn River, New York.

From the facts and for the reasons given I concur in the opinion of the district officer and the Board of Engineers for Rivers and Harbor

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that this locality is not worthy of improvement by the General Government.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF CHANNEL FROM PETERS NECK POINT THROUGH LONG BEACH BAY TO HORN RIVER, NEW YORK.

UNITED STATES ENGINEER OFFICE,
New York City, August 30, 1907.

GENERAL: I have the honor to submit the following report upon a preliminary examination of channel from Peters Neck Point through Long Beach Bay to Horn River, made in compliance with Department letter dated March 4, 1907, and pursuant to the requirements of the river and harbor act of March 2, 1907, of which the following is an extract: "Channel from Peters Neck Point through Long Beach Bay to Horn River."

A preliminary examination of Peters Neck Bay was reported upon November 4, 1886, and the report is printed on pages 637–639, Report of the Chief of Engineers, U. S. Army, for 1887.

Attention is invited to the United States Coast and Geodetic Survey chart No. 115, 1896, and to the United States Geological Survey topographic sheet of the Shelter Island quadrangle (Suffolk County), New York, the latter particularly for the roads to the southeast of Orient, the southeastern extremity of these roads being at the wharf (Hallock's) from which the channel whose improvement is desired runs out through Long Beach Bay.

The length of this channel is about 1½ miles, which is practically the distance by road from the wharf to the Orient Harbor wharf.

The existing channel results from private enterprise and furnishes a depth of 6½ feet at mean low water; the corresponding depth in Long Beach Bay is reported as 5 feet. The rise of tides is about 2 feet.

Commencing in 1887, parties interested in farm gardening about Orient began the work of building dikes and dredging to improve the channel now under consideration. Dikes from 90 to 70 feet apart, and generally on both sides of the channel, for a channel length of 1,400 yards, are reported constructed at a cost of about $25,000. As stone has been used in their construction, any widening of the channel would be more expensive than ordinary sand dredging. The parties claim to have in good working condition a plant costing $4,500, embracing a pile driver, a tug, dredge, and floats and scows. Continuing this work has become too expensive for private enterprise.

Commercial statistics for 1902 have been furnished by Mr. Lucius H. Hallock, presumably of Geo. W. Hallock & Son, the firm which first undertook work on this channel. He reports a gross tonnage of 22,400 tons as entering the bay; 2,000 tons of fertilizer, 550 tons of coal, and 47 cords of wood were received. The wood was brought in to tide over a shortage of coal due to the anthracite coal strike. The usual receipts of coal are reported as 800 tons. Thirty-two

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thousand two hundred and fifty barrels of farm produce were shipped to New York, Boston, and elsewhere. The great rush of shipments is from July 10 to August 15.

The total area of land from Orient east to the end at Orient Point, including everything out of water, is about 5 square miles. By considering the roads shown on the topographical map, as well as the road northeasterly from Hallock's wharf recently opened, it will be seen that all of this area except about half a square mile is not more than one half a mile more distant by road to the Orient Harbor wharf than to Hallock's wharf. Constructing additional wharves at Orient, if needed, would be a better business proposition for the community as a whole than to go to the expense of increasing or even maintaining the Hallock channel.

I consider the channel from Peters Neck Point through Long Beach Bay to Horn River as not worthy of improvement by the General Government.

Very respectfully, your obedient servant,

JOHN G. D. KNIGHT,
Colonel, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.

[Second indorsement]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., September 23, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

The Board of Engineers for Rivers and Harbors has had before it the within report of the district officer on a preliminary examination of "channel from Peters Neck Point through Long Beach Bay to Horn River," and in connection with its consideration of this subject has reviewed a report submitted in 1886 on this same subject, together with about 25 letters representing the views of interested parties. These letters are principally from farmers, and contain but little statistical information, but indicate in a general way that the community would be benefited if the desired improvement were undertaken by the United States. The party principally interested appears to be Mr. Lucius H. Hallock, who has submitted a statement containing a description of the work already done by private parties and statistical data relative to the commerce of the community.

Private interests have constructed, by means of dredging and dikes, a channel 6½ feet in depth from Peters Neck through Long Beach Bay to Hallock's wharf, a distance of about 1½ miles, at a cost, as reported, of about $25,000. This channel has been maintained by private interests for the benefit of a farming community, and those interested now desire that the Government relieve them from the burden of maintenance. There are no manufacturing or commercial industries interested, the country adjacent being occupied by farm gardeners, who bring in fertilizers and supplies and ship out their products from this wharf. About a mile and a half from this wharf is the village of Orient, located on Orient Bay, a very good natural harbor. There is a wharf at this place which affords facilities for the receipt and shipment of commerce for the village of Orient and the adjacent country. The total area tributary to these two wharves,

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including the entire Orient Point, is reported to be about 5 square miles. The distance from the Orient wharf to the Hallock wharf is about 1½ miles, and the distance by road over which the farmers must go to reach the natural harbor at Orient is only about 1 mile farther than to the Hallock dock, to which the artificial channel requiring considerable maintenance leads. An examination of the coast chart of this locality indicates that there is ample room for the construction of other wharves in Orient Harbor should they be required.

In the opinion of the Board conditions all point to the harbor of Orient as the natural point for economically establishing facilities for handling the commerce of this community. One mile additional haul for a farmer is not generally considered burdensome. While the Board recognizes that certain benefits would accrue to a few farmers in the immediate vicinity of the Hallock wharf were the United States to undertake the maintenance of the channel leading thereto, it does not believe that the general public would be benefited to a sufficient extent to warrant the Government in undertaking the work. It must therefore concur with the district officer in reporting the locality as unworthy of improvement.

For the Board:

D. W. Lockwood,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 448.

CHANNEL FROM PALACIOS TO MATAGORDA BAY, TEXAS.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF CHANNEL FROM PALACIOS TO MATAGORDA BAY, TEXAS.

JANUARY 6, 1908.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 26, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated 23d instant, together with copy of a report from Capt. John C. Oakes, Corps of Engineers, dated August 7, 1907, of a preliminary examination of channel from Palacios through Tres Palacios Bay to Matagorda Bay, Texas, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

WM. H. TAFT,
Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 23, 1907.

SIR: I have the honor to submit herewith report of August 7, 1907, by Capt. John C. Oakes, Corps of Engineers, on preliminary examination authorized by the river and harbor act approved March 2, 1907, of channel from Palacios through Tres Palacios Bay to Matagorda Bay, Texas.

Tres Palacios Bay has a present depth of from 3 feet to 7 feet. In the opinion of Captain Oakes a project for a channel of 8 feet in depth

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and 60 feet in width from Palacios to Matagorda Bay is worthy of consideration by the Government, and he recommends a survey for the purpose of definitely determining the cost of such an improvement.

From the facts and for the reasons given I concur in the opinion of the division engineer, Col. E. H. Ruffner, Corps of Engineers, and the Board of Engineers for Rivers and Harbors that this locality is not worthy of improvement by the United States at the present time. I recommend, therefore, that no survey be ordered and that this report be transmitted to Congress.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF CHANNEL FROM PALACIOS THROUGH TRES PALACIOS BAY TO MATAGORDA BAY, TEXAS.

UNITED STATES ENGINEER OFFICE,
Galveston, Tex., August 7, 1907.

GENERAL: In compliance with your instructions of March 14, 1907, I have the honor to submit the following report on preliminary examination of channel from Palacios to Matagorda Bay.

Palacios is situated on Tres Palacios Bay, and is on land from 12 to 20 feet above mean low tide. It has railroad connection by a branch of the Galveston, Houston and San Antonio Railway, running to Bay City and Wharton. This branch crosses the St. Louis and Brownsville Railway at Blessing about 12 miles from Palacios.

In 1904 Palacios' population was 48, in 1906 1,000, and at the present time there are 1,200 inhabitants.

Palacios Bay is an extension of Matagorda Bay, the dividing line being marked in general by a bar extending from Olivers Point to Wells Point.

Across this bar are two channels—Birds Island channel, situated about 2 miles from Olivers Point, and the Wells Point channel, situated about 1 mile and a half from Wells Point. If a channel is to be dredged from Matagorda Bay to Palacios it should cross the bar at the Birds Island channel.

In general there is a minimum depth of about 11 feet of water across Matagorda Bay from Pass Cavallo to the bar dividing Matagorda and Tres Palacios bays, where there is about 5 feet of water. Tres Palacios Bay has a general depth of from 5 to 7 feet at ordinary low water. The course from Birds Island channel to Palacios has a depth of 5 or more feet, except for a distance of perhaps one-half mile near Palacios, where there is a depth of from 3 to 5 feet. The distance from Birds Island channel to Palacios is about 5 miles.

I proceeded by boat from Palacios to Matagorda Bay and sounded every 100 feet or so the whole distance. During the time I was on the bay there was a high tide, which the boatmen present assured me was very exceptional. From testimony given by people in the town and from observation during a subsequent visit to the locality, I judge that this information was correct and that the tide must have been approximately 1½ feet. My soundings throughout the course

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showed approximately 7 feet. The bottom was, as near as I could tell, composed of a sticky blue mud mixed with shell and some sand at intervals. There are very few streams entering this bay, and the amount of silt carried into the bay is very small. In my opinion a channel excavated along the bottom of this bay would require less for maintenance than a channel through any other of the bays in this vicinity.

Previous to 1904 the country adjacent to Palacios was used for grazing purposes. At about that time the people began to cultivate rice, and since that time the acreage has continually increased until at present there are about 3,145 acres under cultivation, which are expected to produce an average crop of 15 bags per acre, or a total of 47,175 bags, weighing over 4,000 tons.

The oyster industry at Palacios gives employment at the present time to 30 boats, requiring to man them 112 men. From August 31, 1905, to August 31, 1906, there were marketed at Palacios 8,600 barrels of oysters and 62,500 pounds of fish. From August 31, 1906, to the present time 14,432 barrels of oysters and 6,500 pounds of fish were marketed.

The people of Palacios have made efforts to bring freight in by schooners and within the last two years have received considerable lumber in that way. The difficulty in handling freight by water at present is that a schooner whose draft is sufficient to enable her to go outside from Galveston to Palacios is unable to get near enough the wharf to be unloaded with facility. Efforts have been made to bring in a cargo of miscellaneous supplies during the last two months. One schooner was partly loaded when the owners refused to go on on account of the shallow draft of the schooner and rough weather. The owners of other deeper draft schooners would not undertake the work on account of shallow water in Palacios Bay. It is said, and I am of the opinion, that if a 7 or 8 foot channel were assured the people could bring in by schooners from Galveston the greater part of the materials needed for consumption in the town and vicinity and that they would ship large quantities of rice in the same manner.

According to data received through the railroad commission of the State of Texas and furnished by the Galveston, Houston and San Antonio Railway, there was received at Palacios 7,366 tons of freight during the year ending April 30, 1907. Most of this freight originated at Galveston and all, we may say, is controlled by the Galveston freight rate.

Classification and rates between Galveston and Palacios.

[Furnished by the Galveston, Houston and San Antonio Railway.]

	Class.	Rate.
		Cents.
Less than carload lots	1	60
Do	2	55
Do	3	46
Do	4	34
Carloads	5	34
Do	A	35
Do	B	32
Do	C	27
Do	D	20
Do	E	17

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A merchant, Mr. Hill, informed me on August 3 that on his last shipment of hardware the railroad charged him 90 cents per hundred, which was practically double freight.

Water rate:	Cents.
Merchandise	20
Lumber	13½

All of the freight received would be affected by the water rate. Allowing an average saving of 10 cents per hundred between the present rate and water rate, which is exceedingly conservative, a saving on the present freight of $14,732 would be made yearly.

A water rate on rice from Palacios would affect the whole of the crop of 4,000 tons. The present rate is 34 cents per hundred.

A saving of 10 cents at least should be made, or approximately $8,000. A yearly saving of over $20,000 can thus be shown to Palacios alone on the supposition that it is connected with deep water.

It is not thought there would be a large saving in the oyster and fish business, as those products have to be sent by express or fast freight, but this business would be benefited by a deeper channel because schooners of a deeper draft would be used, thereby reducing expenses.

The commerce of Palacios and neighboring towns is growing rapidly. More land is being put under cultivation each year and a channel of sufficient width and depth to insure a line of schooners between Galveston and Palacios would assist greatly in the development of the country.

To excavate a channel 8 feet deep and 60 feet wide from Palacios to Matagorda Bay would probably cost less than the saving in one year to the people of Palacios and vicinity, not considering at all the advantage to the numerous towns within a radius of 30 miles which would surely reap some advantage from the improvement.

In view of the above facts I am of the opinion that a project for a channel from Palacios to Matagorda Bay of 8 feet in depth and 60 feet in width is worthy of consideration by the Government.

For the purpose of determining definitely the cost of dredging and maintaining a channel of the above dimensions, I recommend that $500 be allotted for a survey and estimate.

Respectfullv submitted.

JOHN C. OAKES,
Captain, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[Fifth indorsement.]

OFFICE DIVISION ENGINEER, GULF DIVISION,
New Orleans, La., September 11, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

From the data of this report I am led to think that from the limited population of the vicinity and the small amount of tonnage in sight the idea of any improvement by dredging in so large and flat a bay as is described is inadvisable at the present time. There-

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fore I am of the opinion that this proposed improvement is unworthy of being undertaken by the United States at the present time.

E. H. RUFFNER,
Colonel, Corps of Engineers,
Division Engineer.

[Seventh Indorsement.

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., October 28, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

On the subject of the improvement of the channel from Palacios to Matagorda Bay the district officer expresses the opinion that a project for a channel 8 feet in depth and 60 feet in width is worthy of consideration by the General Government, and he recommends that a survey and estimate be made at a cost of $500. The division engineer, however, is of opinion that the limited population of the vicinity and the small amount of commerce in sight do not warrant at the present time the dredging of a channel in so large and flat a bay. With a view to securing additional information, the district officer, at the request of the Board, invited interested parties to submit their views upon the subject of this improvement, but no communications have been received.

Palacios is situated at the head of Tres Palacios Bay, a distance of about 5 miles from the junction of the latter with Matagorda Bay. This waterway, through which a channel would have to be dredged, has a depth of from 5 to 7 feet, except for the upper half mile, where the depth is from 3 to 5 feet. The depth of 8 feet proposed by the district officer would appear to be the least that would accommodate vessels capable of going by sea to Galveston, the logical market for the products of this locality.

The population of the tributary country is not large, nor is the present commerce extensive. Until quite recently the adjacent country was used almost solely for grazing purposes, but within the last year or two the cultivation of rice has been undertaken, and it is expected that this industry will become an important one. There is also some traffic in oysters and fish, but it is not expected, on account of the perishable character of this commerce, that much of it will be carried by water, even if the improvement desired is undertaken. Palacios is now connected with Galveston and the outer world by rail, and water communication is also possible if light-draft vessels are used or if the commodities to be shipped are transferred by lighter to deeper water in Matagorda Bay.

Tres Pacacios Bay, through which the proposed channel would have to be dredged, ranges in width from 2,400 feet to 12,000 feet, sufficient for the development of waves of considerable size, and although the district officer states that the material appears to be composed of sticky mud mixed with shells and some sand at intervals, and that a channel excavated along the bottom of this bay would require less for maintenance than a channel through any of the other bays in this vicinity, it is reasonable to believe that constant maintenance to some extent would be necessary in order to insure a continuous channel of the depth proposed. The cost of this maintenance, in connection

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with the initial cost of the work, would, in the opinion of the Board, be out of proportion to the benefits that would accrue to the present and reasonably prospective commerce of the locality.

There seems to be a tendency in this section of country to convert to a certain extent the grazing lands into farms, but in the opinion of the Board this process has not advanced sufficiently to insure a commerce of any considerable extent or to justify the Government in undertaking improvements for its benefit.

In view of these facts, the Board expresses the opinion, concurring with the division engineer, that it is not advisable at this time to undertake the improvement of a channel from Palacios to Matagorda Bay.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 449.

JAMAICA BAY TO PECONIC BAY, INCLUDING CHANNELS TO PARSONAGE AND SAMPAWAMS RIVERS AND TO FREEPORT AND MASSAPEQUA CREEKS, NEW YORK.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF CHANNEL FROM JAMAICA BAY TO AND THROUGH GREAT SOUTH BAY TO PECONIC BAY, INCLUDING CHANNELS TO PARSONAGE AND SAMPAWAMS RIVERS AND TO FREEPORT AND MASSAPEQUA CREEKS, NEW YORK.

JANUARY 6, 1908.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 30, 1907.

SIR: I have the honor to transmit herewith, a letter from the Chief of Engineers, U. S. Army, dated 27th instant, together with copy of a report from Col. John G. D. Knight, Corps of Engineers, dated July 17, 1907, of a preliminary examination of a proposed inland route on the southern shore of Long Island, New York, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 27, 1907.

SIR: I have the honor to submit herewith for transmission to Congress report of July 17, 1907, by Col. John G. D. Knight, Corps of Engineers, on preliminary examination authorized by the river and

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harbor act approved March 2, 1907, of a proposed inland route on the southern shore of Long Island, New York, as follows:

Jamaica Bay, with a view to obtaining a channel one hundred feet wide and six feet deep to and through Great South Bay to Peconic Bay, including channels to Parsonage and Sumpawams rivers and Freeport and Massapequa creeks.

From the facts and for the reasons given I concur in the opinion of the district officer and the Board of Engineers for Rivers and Harbors that this locality is not at this time worthy of improvement by the General Government in the manner proposed.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF CHANNEL FROM JAMAICA BAY TO AND THROUGH GREAT SOUTH BAY TO PECONIC BAY, INCLUDING CHANNELS TO PARSONAGE AND SAMPAWAMS RIVERS AND TO FREEPORT AND MASSAPEQUA CREEKS, NEW YORK.

UNITED STATES ENGINEER OFFICE,
New York City, July 17, 1907.

GENERAL: I have the honor to submit the following report upon a preliminary examination of proposed channel from Jamaica Bay to and through Great South Bay to Peconic Bay, including channels to Parsonage and Sampawams rivers and Freeport and Massapequa creeks, made in compliance with Department letter dated March 4, 1907, and pursuant to the requirements of the river and harbor act of March 2, 1907, of which the following is an extract:

Jamaica Bay, with a view to obtaining a channel one hundred feet wide and six feet deep to and through Great South Bay to Peconic Bay, including channels to Parsonage and Sumpawams rivers and Freeport and Massapequa creeks.

The waters referred to herein are shown on United States Coast and Geodetic Survey charts Nos. 117, 118, and 119.

It is proposed to consider a channel of six feet depth at mean low water between two points which, measured on an air line, are 69 miles apart, and 76 if measured along the line requiring least dredging and cut; also four lateral connections of a total length of 8 miles.

The route must be bridged at crossings of highways and railroads, calling for draws, or in several cases at least elevation of grades.

It has been said both cut and dredging are involved. The cut must be through valuable suburban property in the vicinity of Far Rockaway for about 1½ miles.

Of the 84 miles of route through existing waters, about 38 must be dredged. Much of this dredging will be through waters given up, to a great extent to oyster planting, and will to that extent, prejudice the very parties expecting to be benefited by the proposed channel.

Of the four lateral channels, the most easterly cuts the main channel about 22 miles from its westerly extremity; the remaining 54 miles will be in the interests mainly of fishermen and those having pleasure craft.

From Great South Bay, through which 40 miles, or nearly six-tenths of the channel would run, it is stated, in a bulletin of The Forest, Fish, and Game Commission of the State of New York, entitled "Shell Fish

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Culture in New York, 1905," that a fair estimate shows a production of 780,000 bushels of oysters. Seed and market oysters were sold to the amount of $440,750, and a total of 33 vessels were employed in the business, of a total tonnage of about 400 tons. The value of the shore property interested in the business was $14,800; the amount paid out in wages, $58,950.

The commerce of Great South Bay for the year 1906, exclusive of fish and oysters, is reported at 227,000 tons, valued at $3,860,000.

Some 21 oyster vessels are stated to run from Rockaway Bay to New York City, but the proposed channel would hardly benefit them.

The oyster men of Great Peconic, Little Peconic, and Gardiners bays ship a considerable portion of their stock directly from Greenport to the New England States, and certainly would ordinarily prefer Long Island Sound to the proposed channel in going to New York.

The commerce of Moriches and Shinnecock bays is not known, but must be inconsiderable, in view of the absence of outlets of any considerable size.

It is doubtful whether the commerce of the four creeks mentioned, Parsonage, Freeport, Massapequa, and Sampawams, would justify the cost of constructing the lateral channels to these streams.

A 6-foot channel without lateral channels to various towns and villages will foster but little commerce. Certainly the probable cost of the one under consideration will be wholly out of proportion to the small benefits to commerce which may be expected to develop from its use, which use must be local only.

This preliminary examination is based upon sundry maps and records of this office; they suffice as foundation for my opinion that the construction of the proposed channel, involving great expense to the United States, is not now justified.

I recommend that no further detailed survey and estimate of cost be called for.

Very respectfully, your obedient servant,

JOHN G. D. KNIGHT,
Colonel, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.

[Second indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., August 19, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

The act providing for this examination contemplates an inland route through and connecting the natural waters along the southern shore of Long Island, and four lateral channels leading up tributary streams. The length of the main route is 76 miles and that of the laterals 8 miles. Of the total distance, 38 miles requires dredging, 1½ miles of which would be through valuable suburban property, and the route would have to be bridged at rail and highway crossings.

The western part of the route would have some general commercial importance and value, as the laterals in connection with the main route would provide navigation facilities to several small towns or villages having an aggregate population of several thousand. The principal value of the eastern section, which for the most part

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passes through large bodies of water and does not connect directly with business centers, would be in the interests mainly of fishermen and those using pleasure craft.

In response to a notification from the district officer to interested parties, quite a number of letters bearing upon the subject of this improvement have been received by the Board. Several of them indicate an interest in the matter by yacht club members whose excursions in the waters through which the route passes would be rendered more convenient and enjoyable. Others refer in rather general terms to the commercial advantages that would result from the improvement, but the statements and arguments presented have not convinced the Board of the commercial necessity for the proposed improvement, nor of the probability of its resulting in benefits to the community commensurate with the probable cost of the work, which would be considerable.

In view of the foregoing, the Board concurs with the district officer in the opinion that this improvement by the United States is not at the present time justified or advisable.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 450.

HARBORS OF REFUGE, NORTH SHORE OF LAKE SUPERIOR.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION FOR HARBORS OF REFUGE ON NORTH SHORE OF LAKE SUPERIOR.

JANUARY 6, 1908.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 28, 1907.

SIR: I have the honor to transmit, herewith, a letter from the Chief of Engineers, U. S. Army, dated 27th instant, together with copy of a report from Maj. Graham D. Fitch, Corps of Engineers, dated October 17, 1907, of a preliminary examination of the north shore of Lake Superior, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

WM. H. TAFT,
Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 27, 1907.

SIR: I have the honor to submit herewith, for transmission to Congress, report of October 17, 1907, by Maj. Graham D. Fitch, Corps of Engineers, on preliminary examination authorized by the river and harbor act approved March 2, 1907, of Lake Superior, with a view to locating a harbor or harbors of refuge on the north shore.

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From the facts and for the reasons given I concur in the views of the local officer, the division engineer, and the Board of Engineers for Rivers and Harbors that it is not advisable for the United States to provide additional harbors of refuge on the north shore of Lake Superior at the present time.

Major Fitch refers to the need of a number of fog signals to warn larger vessels away from this shore of Lake Superior in stormy and thick weather. It would appear that some such aids to navigation would in a large measure obviate the necessity for expensive harbors of refuge; but the advisability of providing the same does not form a part of the present investigation and must be determined by another branch of the Government.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF THE NORTH SHORE OF LAKE SUPERIOR WITH A VIEW TO THE LOCATION OF HARBORS OF REFUGE.

UNITED STATES ENGINEER OFFICE,
Duluth, Minn., October 17, 1907.

GENERAL: 1. In compliance with Department letter of March 14, 1907, I have the honor to submit the following report upon a preliminary examination of "Lake Superior, with a view to locating a harbor or harbors of refuge on the north shore."

2. *Descriptive.*—The north shore of Lake Superior, from Duluth to the international boundary at Pigeon River, consists of a bold and rocky coast, with deep water close in shore except for small islands and dangerous reefs. There are numerous small bays and indentations which afford shelter more or less complete from storms blowing from certain directions, but few harbors which afford protection from all winds. In fact, there was only one natural harbor, Grand Marais, that approximated to complete protection from storms. This has been further protected and deepened by Government improvements, and more remains to be done to make the harbor complete. Another bay, Agate Bay, commonly known as Two Harbors, had originally only partial protection from storms, but has been made into a well-protected harbor by Government breakwaters.

3. These two protected harbors are so located as to leave an interval of coast 26 miles long between Duluth and Two Harbors, and a distance of 81 miles without protection between Two Harbors and Grand Marais. Beyond Grand Marais is a stretch of 34 and 36 miles before coming to the two bays known as Grand Portage Bay and Wauswaugoning Bay, where considerable protection from storms may be had.

4. For maps of the north shore of Lake Superior reference is made to the following charts published by the United States Lake Survey: Lake Superior (entire lake), catalogue No. S; Lake Superior No. 3, catalogue No. 3S; coast chart No. 6, catalogue No. Sf.

5. For fuller details on a larger scale see the unpublished Lake
vey detail sheets of the localities, "Superior 61" and "Superior
which include Beaver Bay and Two Islands.

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6. *Commerce.*—For the purpose of obtaining information regarding the amount of commerce which would be benefited by the proposed improvement and opinions as to shelter needed, a circular letter was prepared and mailed to more than fifty persons or firms who are doing business along the north shore, with questions regarding the kind and amount of business transacted at the present time and contemplated in the future, the need of additional harbors of refuge, and the best location for same.

7. Replies were received from eighteen of these parties, and an abstract[a] of the essential portions of them is given herewith, to which attention is invited. From the categoric answers as to amounts of commerce I find the following totals:

Trips with coasting vessels and tugs in the season of 1906		368
Freight carried	tons..	18,985
Passengers		23,774
Logs	feet B. M..	34,000,000
Telegraph poles and ties		20,000

8. Several of the replies stated the character of business transacted, but did not give amounts. These included the following classes of freight: Corundum, fish, poles, ties, rafts of logs, supplies, and general merchandise. The figures given are therefore presumably considerably less than the actual amount of commerce. Several stated that the amount of business would increase in coming years.

9. The natural resources of this country, as will be seen from the foregoing, consist of forest products, iron ore, corundum, fish, gravel, etc. Some farming is done; but, generally speaking, the country is wild and unsettled.

10. Vessels trading at Grand Marais Harbor, Minnesota, would be benefited by additional provision for shelter along the north shore, as these have Duluth for one terminus of their route. The amount of this commerce for the season of 1906 included 1,224 entrances and clearances, with 30,910 tons of cargo. This, however, should not all be added to the amount of commerce given in paragraph 7, as some of it (at least that carried by the Booth Line) is included in both statements.

11. *Previous reports.*—Several localities along the north shore of Lake Superior have already been reported upon with reference to the construction of harbors or refuge, by officers of the Corps of Engineers in charge of this district. As these reports have a bearing upon the present investigation, a brief abstract will be given herewith of their contents and conclusions.

12. Maj. Clinton B. Sears, Corps of Engineers, submitted a report, dated July 12, 1899, on a preliminary examination of "Two Islands, or Saxton, Minnesota, with a view of making a harbor of refuge at that point." This report, with indorsements thereon, is printed in House Document No. 138, Fifty-sixth Congress, first session, and at page 3629 of the Annual Report of the Chief of Engineers for 1900. Major Sears in this report describes the physical features of the locality and concludes as follows:

* * * At present there is no commerce whatever demanding an improvement of this harbor.

The commerce along the north shore is very restricted, being confined to two trips a week of a small steamer. There is no immediate prospect of this commerce materially increasing during the next few years. The harbors of Two Harbors and Grand

[a] Not printed.

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Marais, both under improvement by the Government, give ample protection to vessels large and small from both northeast and southwest storms.

In my opinion, therefore, owing to the restricted commerce, the small benefits to be derived, and the great expense involved, this harbor is not worthy of improvement by the Government.

13. The opinion of the local officer was concurred in by the division engineer and by the Chief of Engineers.

14. Capt. D. D. Gaillard, Corps of Engineers, reported January 16, 1903, upon a preliminary examination of the "bay at the mouth of Split Rock River, with a view to constructing a harbor therein." This report, with indorsements, is printed in House Document No. 170, Fifty-eighth Congress, second session, and at page 2800 of the Annual Report of the Chief of Engineers for 1904.

15. This report seems to have had reference solely to providing for the necessities of the local commerce of this small bay and logging settlement. After stating the present and prospective commerce and the probable cost of the improvement, Captain Gaillard did not consider the harbor worthy of improvement. His views were concurred in by the division engineer, by the Board of Engineers for Rivers and Harbors, and by the Chief of Engineers. The indorsement of the Board of Engineers went further and considered the need of a harbor of refuge at this point. Their remarks on this question are worthy of quotation here:

> There have been many representations made to the Board that a harbor of refuge at Split Rock would be of great benefit to the shipping of Lake Superior. The great lake carriers in the Duluth and Superior trade habitually pass from 18 to 20 miles south of Split Rock, and when nearest that point are equally near to the Apostle Islands, which lie close to their course and afford perfect shelter in storms. * * *
>
> Due to the great depths existing close inshore a harbor of refuge of sufficient capacity to shelter the longer class of lake vessels in severe storms would be enormously expensive. Neither such a large harbor nor a small harbor for general commerce and for the shelter of the smaller classes of vessels plying along the north shore would present advantages at all commensurate with the cost.

16. *Additional harbors desired.*—Of the eighteen interested parties from whom replies to my circular letter were received, all except one believed that one or more additional harbors of refuge were needed. Two of these were of the opinion that more than one additional harbor was needed. The majority considered that the vessels which would be benefited were of the smaller class, such as coasting steamers, tugs, etc. As to the locality recommended for an additional harbor, seven of the writers favored Two Islands, five favored Beaver Bay, two Split Rock or near there, one recommended the bay on the east side of Grand Marais Harbor, and one thought it should be halfway between Two Harbors and Grand Marais. One writer believed no additional harbor was necessary, but that the harbor of Grand Marais should be further improved.

17. *Facts and conclusions.*—It is evident from the location of the ent harbors as stated in paragraph 3 that no additional harbor eded anywhere on the north shore except possibly between Two ors and Grand Marais, and none is requested except for this ch by those who have expressed themselves on the subject.

18. On this stretch of the coast there are two sites, and only two, hich by their location and physical features are at all adapted for the onstruction of a harbor of refuge. These are Two Islands and Beaver Bay. Split Rock, which was advocated by two parties, is too near Two Harbors to serve a useful purpose, and will not be considered here. Neither Two Islands nor Beaver Bay divides the 81-mile

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stretch of coast into two equal parts, but Two Islands comes nearer to it than Beaver Bay.

19. Two Islands is situated at a distance of 50 miles from Two Harbors and 31 miles from Grand Marais. There is good water and good anchorage between the two islands which give the place its name and the mainland. These islands are from 1,000 to 1,400 feet from shore. The westerly island is 1,200 feet long and the other 700 feet long. Their longer axis lies parallel with the shore, and there is a space of 1,000 feet between the islands. There is a reef with shallow water extending eastward 900 feet from the east island.

20. A good harbor for coasting vessels could be constructed here by building a breakwater from the west end of the west island to the shore in a direction a little west of right angles to the shore line, and another breakwater built from the eastern extremity of the eastern island easterly and along the crest of the reef for a distance of about 800 feet, and then turning and running to the shore across the deeper water in a direction a little east of right angles to the shore. Another short piece of breakwater should extend west about 200 feet from the west end of the east island to cover some shoal water and support a lighthouse and fog signal. The aggregate length of these breakwaters would be 3,300 feet. This would give a well-protected harbor area of 108 acres, of which 90 acres has a natural depth of 18 feet or more, running generally from 30 to 60 feet, and a deep-water entrance 700 feet wide. The maximum depth of water at the west breakwater would be about 42 feet and about 70 feet at the east breakwater, as given by Lake Survey detail maps. It would be quite feasible to construct these breakwaters, but it will readily be seen that the cost would be considerable. These islands now afford some protection from storms, and tugs frequently run in behind them for shelter, where they usually ride out ordinary storms, but instances have occurred of their being driven ashore and suffering damage during severe storms.

21. There is no town or settlement and no commerce at this locality.

22. Beaver Bay is the other available site for a harbor. It is 25 miles from Two Harbors and 56 miles from Grand Marais. This bay is about 3,500 feet long, or nearly three-fourths of a mile, and extends in from the general line of the shore about 1,800 feet. It now affords good protection from southwest storms, but not from northeast storms, which are the worst experienced on this part of the lake. There is a small village here and some farming lands in the vicinity. The Clow-Nicholson Transportation Company states that "there is more freight handled at Beaver Bay than at any one point between Two Harbors and Grand Marais, the country being well settled back of that point."

23. A good harbor of refuge for coasting vessels could be constructed here by building a breakwater about 1,500 feet long in a direction about south by west, starting from the small island in the easterly part of the bay and closing up the gap of shoal water between the island and the shore with a breakwater 380 feet long. This would leave an entrance 1,500 feet wide of deep water, and inclose an area of 117 acres, of which 92 acres would have a greater depth than 18 feet and a maximum depth of about 99 feet. A considerable portion of the breakwater would lie in a depth of about 100 feet. The construction of a breakwater here would present no engineering diffi-

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culties, as the substructure would probably consist of a large rubble mound of hard and heavy rock, with which this country abounds, and the superstructure could be built of either timber or concrete. The cost, however, as appears from a preliminary computation would be large. There should then be a light-house and fog signal on the high point of land at the west side of the entrance and a pier light and fog bell at the outer end of the breakwater.

24. The area of this harbor (117 acres) would be greater than that of Two Harbors, which has 109 acres, and still greater than Grand Marais, with its 61 acres.

25. The character of the bottom is marked "rock" and "stony" on the Lake Survey map. It is stated by E. Jacques & Sons that the anchorage at Beaver Bay is not as good as at Two Islands, and that the anchorage at Two Islands "is the best to be found on the whole north shore, the bottom being clay and gravel." I have heard no criticism from any other source regarding the anchorage at Beaver Bay.

26. Comparing these two places with each other, it appears that Beaver Bay has an advantage over Two Islands in point of size, and also by having a wider opening for an entrance. It also has a local commerce of some importance. Two Islands has a better location with respect to distance from other harbors, better anchorage, and the cost of improvement, along the lines mentioned in this report, would be about two-thirds of the cost at Beaver Bay. The cost of improvement at each of these places could be lessened by placing the breakwaters in shoaler water, but this would in my opinion be at too great a sacrifice of room.

27. It is not believed that a harbor at either of these two places, improved in the manner described herein, would be of much use to the large class of vessels doing business at Duluth-Superior and Two Harbors. Many of these vessels are more than 400 and 500 feet in length, and some of the later ones are more than 600 feet long and need a great deal of room for handling themselves in a harbor and for entering, particularly during a severe storm. They find it difficult now to get into Two Harbors in a hard northeast storm, where the width of opening between the breakwaters is 1,300 feet. The difficulty there, however, is increased by the presence of the ore docks, which occupy so much of the space just inside the harbor.

28. A harbor providing adequate facilities for the larger vessels along this bold and rugged coast would mean breakwater construction in a depth of several hundred feet of water and a correspondingly enormous expense that would be prohibitive.

29. Many large vessels have been stranded on the north shore between Duluth and Grand Marais, but this has almost invariably happened when thick weather occurred along with a severe and protracted northeast storm, so that vessels were blown out of their course and were not able to determine their position. Besides this, there is a good deal of local attraction of the compass at several points along the north shore, a description of which may be seen in Lake Survey Bulletin No. 17, pages 15–18, and this has probably drawn the vessels ashore in some instances when they were already out of their course and near the north shore. What would be of more use than harbors of refuge to the larger vessels in stormy and thick weather is a number of fog signals to warn them away from the shore, and so distributed

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that they would always be within hearing of some one of them. For refuge the large vessels would rather run in behind the Apostle Islands than try to make a small harbor along the north shore. On this point see the remarks of the Board of Engineers already quoted.

30. There have not been any great number of disasters to the coasting vessels in the past due to a lack of places of refuge, considering the number of trips made along the north shore. These vessels are at no time farther than 40 miles from one of the existing improved harbors, and at a less distance from some of the small bays or islands where some protection can be had, and navigators have learned to govern themselves accordingly.

31. It is undoubtedly true that a harbor of refuge constructed at either Two Islands or Beaver Bay would be of much use to vessels which are engaged in commerce along the north shore of Lake Superior, but in view of what precedes I am of the opinion that with the present commerce the benefits to be derived are not sufficient to justify the probable large cost of its construction. I would therefore recommend that no additional harbors be constructed at the present time, but refer here to my recommendation made in a separate report that the harbor of Grand Marais, Minn., be further improved as a harbor of refuge.

Respectfully submitted.

GRAHAM D. FITCH,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

OFFICE DIVISION ENGINEER, NORTHWEST DIVISION,
Chicago, Ill., October 23, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army.

I concur with Major Fitch in his views and recommendations, as given in paragraphs 29–31 of this report.

I consider that the necessity for a good harbor of refuge on this dangerous coast will justify the fullest practicable improvement of the harbor at Grand Marais, Minn., to include liberal dredging behind an improved pier entrance.

W. H. BIXBY,
Lieut. Col., Corps of Engineers,
Division Engineer, Northwest Division.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., November 11, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

In the within report the district officer gives consideration to the advisability of locating a harbor or harbors of refuge on the north shore of Lake Superior. The section of coast within the limits of the United States extends from Duluth to the international boundary line at Pigeon River, a distance of 143 miles. Within this stretch two localities have already been improved as harbors of refuge,

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being Two Harbors and Grand Marais, located respectively 26 and 107 miles from Duluth. The coast is therefore without harbors of refuge between Duluth and Two Harbors, a distance of 26 miles; between Two Harbors and Grand Marais, a distance of 81 miles, and between Grand Marais and Grand Portage Bay and Pigeon River, distances of 34 and 36 miles.

From these figures it is evident that the stretch between Two Harbors and Grand Marais, a distance of 81 miles, is most deserving of consideration as a location for an additional harbor of refuge. Within this area harbors of refuge might be established at Two Islands and Beaver Bay, neither of which, however, equally divides the distance. From Beaver Bay the distance to Two Harbors is 25 miles and to Grand Marais 56 miles, while from Two Islands the distances to the same points are 50 and 31 miles, respectively.

The commerce pertaining to the north shore is small, and while no precise statement of its amount can be given, available data indicate that it is between 20,000 and 50,000 tons. The large expenditure required to construct a harbor of refuge at either of the localities mentioned would not be justified by the benefits which the improvement would afford to this comparatively small local commerce. Nor is it probable that the improvement would ever be of material benefit to through lake commerce, as the main lines of transportation do not pass within convenient distance of the north shore at this part of Lake Superior, and if in stress of weather it is necessary for vessels of these lines to seek shelter, perfect protection can be found close to their course at the Apostle Islands.

After consideration of all available facts in this case, the Board agrees with the district officer and the division engineer in the opinion that it is not advisable for the United States to undertake the construction of an additional harbor of refuge on the north shore of Lake Superior at the present time. Nevertheless the Board recognizes the desirability of making the existing harbors of refuge equal to the necessities of commerce, and it was with this idea in mind that when reviewing a report recently submitted by the district officer on a preliminary examination of "Grand Marais Harbor, with a view to rebuilding the piers at the entrance and enlarging basin," the Board recommended that an estimate of cost of that work be authorized.

While copies of a number of communications from interested parties accompany the within report, the Board has received no response from those invited by the district officer to submit statements and arguments in regard to the necessity for the construction of an additional harbor of refuge.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 451.

TOTUSKEY RIVER, VIRGINIA.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF TOTUSKEY RIVER, VIRGINIA, FOR REMOVAL OF A BAR MIDWAY OF ITS LENGTH.

JANUARY 6, 1908.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, December 23, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated 21st instant, together with copy of a report from Maj. Spencer Cosby, Corps of Engineers, dated July 29, 1907, of a preliminary examination of Totuskey River, Virginia, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 21, 1907.

SIR: I have the honor to submit herewith for transmission to Congress report of July 29, 1907, by Maj. Spencer Cosby, Corps of Engineers, on preliminary examination authorized by the river and harbor act approved March 2, 1907, of Totuskey River, Virginia, with a view to removing bar about midway of its length.

From the facts and for the reasons given I concur in the opinion of the district officer, the division engineer, and the Board of Engi-

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neers for Rivers and Harbors that Totuskey River is not worthy of improvement by the General Government in the manner indicated in the act.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF TOTUSKEY RIVER, VIRGINIA, WITH A VIEW TO REMOVING A BAR ABOUT MIDWAY OF ITS LENGTH.

UNITED STATES ENGINEER OFFICE,
Washington, D. C., July 29, 1907.

GENERAL: In accordance with orders from the Chief of Engineers I have the honor to submit the following report of a preliminary examination of "Totuskey River, with a view to removing a bar about midway of its length," made in compliance with the requirements of the river and harbor act of March 2, 1907.

The examination was made April 24, 1907, by Assistant Engineer F. C. Warman, under instructions from me. On that day he held a hearing at Warsaw, Va., which had been announced in the local newspaper, also by letters to prominent citizens and by means of posted notices. Forty persons were present and showed great interest in the proposed improvement.

The following is from Mr. Warman's report of the examination:

GENERAL DESCRIPTION OF LOCALITY.

Totuskey River rises on the border of Northumberland County, Va., flows in a southwesterly direction through Richmond County, and empties into Rappahannock River 35 miles above its mouth and 7 miles below Tappahannock. The total length of Totuskey River is about 20 miles, and the country through which it flows is undulating and fertile.

About 5 miles above its mouth the river is crossed by a bridge without a draw, over which passes the main "Northern Neck" road, running from Fredericksburg to Chesapeake Bay and passing through Warsaw. About 100 yards above the bridge the river divides into two branches. The larger branch is navigable by lighters for a distance of 6 miles and the smaller branch for 2 miles. There is no request for improvement of the stream above the bridge and hence the examination was limited to the lower 5 miles of its length. The width of this part of the river generally varies from 200 to 500 feet. This portion of the river is largely bordered by marshes, which are covered at high tide and by freshets. These freshets are said to carry large quantities of sediment. The maximum depth found in Totuskey River below the bridge was 24 feet and for the greater part of its length it is 10 feet or more deep. The tides reach several miles above the bridge. The mean range at the mouth is about 1.6 feet and at the bridge about 2 feet.

The area tributary to this creek extends about 6 miles in all directions from the bridge except toward the south, in which direction it is about 3 miles. The principal settlements in this area are Warsaw, with about 275 inhabitants; Haynesville, with 150; Emmerton, with 100; Farnham, with 100, and Lyells, with 75; and the total tributary population is estimated at about 3,000 persons. The residents of this section of the county are chiefly engaged in lumbering, agricultural pursuits, and canning. There are 18 stores in the tributary area.

The soil is fertile and the locality is well adapted for trucking, if quick transportation facilities were available. Fifteen bushels of wheat are usually raised per acre, though some parts of this section yield as high as 35 bushels.

There are no railroads accessible and all shipments are necessarily made by water. Wellford wharf, on Rappahannock River, 6 miles from Warsaw and considerably farther from other parts of this area, is the nearest point touched by the regular line of steamers. The greater bulk of the freight, except perishable articles, is shipped

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from wharves on Totuskey River, of which there are about four. The wharf at Totuskey bridge is in good condition and is evidently much used. The distance from this wharf to Warsaw is about 3 miles and the road is much better than the one to Wellford wharf.

PREVIOUS EXAMINATIONS AND OPERATIONS

An examination of Totuskey River was made in 1874. The obstructions to navigation were found to consist of a bar at the mouth, which forms a part of the wide flat between the outlet of the river and the navigable channel of the Rappahannock, having a ruling depth of 4½ feet, and a bar about 2½ miles above the mouth, known as Bookers bar, having a ruling depth of 3 feet. It was at this time proposed to dredge a channel 60 feet wide and 8 feet deep through Bookers bar, to construct a dike at this bar at an estimated cost of $14,960, and to omit work on the bar at the mouth.

Between June 14, 1880, and August 2, 1882, $10,000 was appropriated for this improvement, and this sum was expended in constructing a longitudinal log dike 2,117 feet long at Bookers bar, which was completed in 1883.

In 1881 a detailed survey was made of both bars and a channel 100 feet wide and 8 feet deep through the bar at the mouth was added to the project, the estimated cost of which was increased to $33,745.03. In 1884 the improvement of the bar at the mouth was dropped from the project and the estimated cost reduced to $21,312.

This stream was carried on the list of improvements until 1890, when, no additional appropriations having been made by Congress, it was dropped. As far as is known no work of improvement has ever been done by private parties.

OBSTRUCTIONS TO NAVIGATION.

The wording of the act authorizing this examination evidently refers particularly to Bookers bar, but as several other bars were found with but little more water over them, their improvement would also be required to render any work done at Bookers bar available, and hence all obstructions to 8-foot navigation which were noted will be referred to in their order, proceeding upstream.

The bar at the mouth of the creek is a wide mud flat and extends out to deep water in Rappahannock River, a distance of about 1 mile. The depth over this bar varies from 4½ to 5 feet at low tide. It is part of an extensive flat in the Rappahannock and has probably been formed by tidal action in the main independent of freshet deposits from Totuskey River, though they have probably contributed somewhat to its formation.

About one-half of a mile inside the mouth of the creek a mud bar is encountered about 500 feet long, with a ruling depth of about 5 feet at low tide.

Coolspring bar, about 2 miles above the mouth of the river, is a mud bar about 1,000 feet long, with a ruling depth of about 4 feet at low tide.

Bookers bar, about 2½ miles above the mouth, is the most serious obstruction to navigation in the stream. The bar is caused by a sudden expansion of the river from about 200 feet to about 900 feet, and also because it is a point of crossing of the channel from one bank to the other. The dike which was constructed in 1883, although in need of some repair, has effectually reduced the width at this point, and the ruling depth over the bar is now about 3½ feet at low tide, which is half a foot greater than it was in 1874. This increase in depth is due to vessels dragging through the mud and to the effect of the dike. This bar is composed of soft mud and is about 3,000 feet long.

Strawberry Hill bar, about 4½ miles above the mouth, is a mud bar with a ruling depth of about 5 feet at low tide. It is at a crossing of the channel and is about 500 feet long.

The wreck of a schooner a short distance below the bridge should be removed.

IMPROVEMENT DESIRED.

A channel 10 feet deep at low tide, 100 feet wide and wider at the turns, and at a turning basin at Totuskey bridge is requested to permit of navigation of the stream by the regular line of steamers plying Rappahannock River. If this improvement can not be obtained it is stated that a channel 8 feet deep at low tide and 80 feet wide and wider at the turns and turning basin would afford the community great relief and would provide all the facilities required by sailing vessels. The longest barge now navigating the stream is 178 feet long, and the turning basin should be at least 250 feet wide.

The dike at Bookers bar would require repair and a jetty would be needed across the mud flat at the mouth to maintain the depth obtained by dredging. Although partly sheltered behind Accaceek Point this jetty would have to be very substantially built to resist the action of ice in Rappahannock River.

If these jetties were constructed it is thought that the cost of maintaining the channel would be comparatively small.

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PRESENT COMMERCE.

At present commerce is carried on in bugeyes, schooners, and barges of from 10 to 250 gross tons, and shipments are made chiefly to Baltimore, Norfolk, Philadelphia, and Elkton, Md. The principal articles of commerce are lumber, wood, railroad ties, grain, farm produce, coal, ice, canned fruits and vegetables, flour, oysters, and general merchandise.

During 1906, the receipts and shipments amounted to about 17,600 tons and were estimated to be worth about $282,000. The shipments are reported to be increasing from year to year, especially those of canned goods and wood for pulp. There is no passenger traffic on Totuskey River at present, as all passengers go to the steamer wharves. Two vessels belong in Totuskey. At the present time the larger vessels can take but a portion of their cargoes at wharves in the river and then drop out to deep water in the Rappahannock where the remainder of the load is lightered out to them.

PROSPECTIVE COMMERCE AND BENEFITS

On account of the difficulties and uncertainties of navigation in Totuskey River the freight rate on lumber is 50 cents per 1,000 feet, board measure, more for lumber delivered inside the river than at neighboring wharves on the Rappahannock and its deeper tributaries, and it is very difficult even then to get vessels when wanted. The rates on other articles are in proportion. If the channels were improved a reduction in freight rates is anticipated, and also greater facility in securing vessels. Shipments could be made in vessels of greater capacity. Much produce which is now shipped by steamers would be shipped by sail vessels at greatly reduced rates, and the haul over the country roads would be greatly reduced.

It is claimed that truck garden produce can be raised here as easily as in the vicinity of Norfolk, and if the steamers entered the stream this industry would develop greatly.

Mr. Willard Thomson, vice-president and general manager of the Maryland, Delaware and Virginia Railway Company, which operates the steamers running on Rappahannock River, states that his steamers have as many landings now as it is possible to make and maintain a schedule satisfactory to the business interests of the territory reached and as to the arrivals in Baltimore. Should the business increase, he states that they might put on more steamers and take up additional landings, but this can not be done with their present service and business.

CONCLUSIONS.

As there are no railroads within many miles of Totuskey River, and the adjacent country is entirely dependent upon water transportation, if it were found that the facilities for the latter could be materially increased at a cost commensurate with the commerce involved, a favorable report might be made upon the improvement of the river. This, however, is not what is called for by the language of the act.

Though the wording is somewhat indefinite, it is believed the "length" referred to is the navigable length of the river, and that therefore the bar in reference to whose removal the examination was called for is Bookers bar. Under the law the only report that can be made is as to the advisability of undertaking to remove this bar, and as Mr. Warman's report shows that there are four other bars in the river having navigable depths over them of only 4 to 5 feet at low water, it is manifest that to remove Bookers bar alone would be of but little advantage to navigation and would not afford the increased facilities desired by those interested.

I am therefore of the opinion that the removal of the bar about midway of the length of Totuskey River is not an improvement worthy to be undertaken by the General Government.

Very respectfully,

SPENCER COSBY,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

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[First indorsement.]

U. S. ENGINEER OFFICE, EASTERN DIVISION,
New York City, July 30, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army, concurring in the views and opinion of the district officer.

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Division Engineer.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., August 19, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

The physical condition of this stream, the improvement desired, and the present and prospective commerce involved are quite fully and comprehensively described within. The improvement desired is reported to be a channel 8 or 10 feet in depth extending from deep water in Rappahannock River to the bridge crossing the stream about 5 miles above its mouth. There are four serious obstructions to navigation of even the 8-foot depth—a bar in the Rappahannock at the mouth of the river, and three bars between the mouth and the proposed head of improvement. Over these obstructions there is an available depth of from 3½ to 5 feet at mean low tide.

It would appear that the language of the act "with a view to removing bar about midway of its length," refers to Bookers bar, which is the worst of these obstructions, but whether this particular bar is the one referred to makes no material difference in the condition to be confronted. The removal of any one of these bars would have little, if any, influence on navigation, for the reason that the others would remain serious obstructions, as all of them have less depth than proposed for the improvement.

In view of the facts just stated, the Board concurs with the district officer and the division engineer in the opinion that the removal of the bar about midway of the length of Totuskey River by the United States is not at this time advisable.

Those known to be interested in this subject were notified by the district officer that they might submit statements or arguments to the Board bearing upon the necessity and advisability of the proposed improvement, but none have been received.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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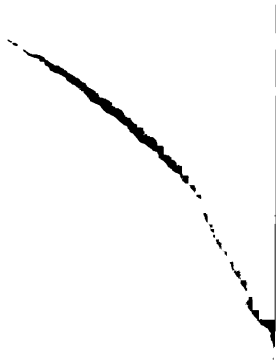

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 452.

SHIPYARD RIVER, OR CREEK, SOUTH CAROLINA.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION, WITH PLAN AND ESTIMATE OF COST OF IMPROVEMENT, OF SHIPYARD RIVER, OR CREEK, SOUTH CAROLINA.

JANUARY 6, 1908.—Referred to the Committee on Rivers and Harbors and ordered to be printed with accompanying illustration.

WAR DEPARTMENT,
Washington, December 23, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated 21st instant, together with copies of reports from Capt. G. P. Howell, Corps of Engineers, dated April 22 and July 24, 1907, of a preliminary examination, with plan and estimate of cost of improvement, of Shipyard River, or Creek, South Carolina, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 21, 1907.

SIR: I have the honor to submit herewith for transmission to Congress reports of April 22, 1907, and July 24, 1907, with map, by Capt. G. P. Howell, Corps of Engineers, on preliminary examination with plan and estimate of cost of improvement of Shipyard River, or Creek, South Carolina, authorized by the river and harbor act approved March 2, 1907.

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Captain Howell recommends the adoption of a project for a 15-foot low-water channel over the entire stretch of the stream under consideration, at an estimated cost of $48,000, the lower section to be first improved at a cost of $22,000, and the remaining portions to be improved as required by the interests of commerce; an estimate of $2,500 is submitted as the cost of maintenance annually.

From the facts and for the reasons given I concur in the opinion of the division engineer, Lieut. Col. Dan C. Kingman, Corps of Engineers, and the Board of Engineers for Rivers and Harbors that this locality is not worthy of improvement by the United States at the present time.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF SHIPYARD RIVER, OR CREEK, SOUTH CAROLINA.

WAR DEPARTMENT,
UNITED STATES ENGINEER OFFICE,
Charleston, S. C., April 22, 1907.

GENERAL: I have the honor to submit the following report upon a preliminary examination of Shipyard River, South Carolina, as prescribed for in section 3 of the River and Harbor act approved March 2, 1907.

The stream called in the act "Shipyard River" is in reality Shipyard Creek, a tributary of Cooper River, Charleston Harbor, as shown on United States coast chart No. 445, Charleston and Vicinity. It is a salt-water creek, starting in the Cooper River about three-eighths of a mile north of Drum Island, and flowing approximately 3 miles in northerly direction, where it divides and heads up in the marshes. Between it and the Cooper River there is a salt marsh, a part of the United States Naval Reservation. On the west bank it flows past high land, on which have been erected manufactories. That bank is, in fact, a continuation of the harbor front of Charleston, and it is for this reason that the improvement is desired. Along the northern part of the city of Charleston on the west bank of Cooper River stretches a marsh, one-half mile wide. Near the southern end of this marsh where the distance across the high ground is less, wharves have been built with approaches back to the high ground or the railroad tracks. But higher up such wharves would be very expensive. The next place where high land touches navigable water is 2 miles farther up, just above the mouth of Shipyard Creek. The next high land on the Cooper River is at the navy-yard, 3½ miles above the mouth of Shipyard Creek.

There are now three manufactories along the creek—two lumber mills and a fertilizer plant. One of the lumber mills has lately been established. As the accompanying letters show, their shipments during the calendar year 1906 amounted to 218,700 tons, valued at $545,000—divided into lumber, 25,700 tons, valued at $231,000; logs, 81,000 tons, valued at $162,000; phosphate rock, 8,000 tons,

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valued at $32,000; manufactured fertilizers, 4,000 tons, valued at $120,000. Eligible sites along the creek have not been exhausted, and it is believed that other enterprises will locate there. The annual shipments from the mills now on the creek will probably show an increase over 1906, as the largest lumber mill did not begin operations till April, 1906.

The channel at the former mouth in Cooper River is 6 feet deep at low water with 100 feet width. About one-half mile above, the creek has broken through the intervening marsh. Between the 6-foot contours the distance is 200 feet; between the 12-foot contours, 300 feet. As far as the upper mill the depth in the creek is generally over 12 feet at low water; but there are shoals on which the depth is about 9 feet. The tidal range is about 5 feet. The maximum draft that can be carried at high water is 13 feet. Small shallow-draft vessels are hard to obtain, and on account of their scarcity their owners can practically dictate terms. Vessels of 18-foot draft are easy to obtain, as this is the ordinary draft of lumber schooners in this harbor. If Shipyard Creek were improved to allow the use of these vessels, it is stated that the saving in freight rates would be at least 50 cents a ton, amounting to over $100,000 a year.

I regard Shipyard Creek as worthy of improvement. No survey is necessary, as in preparing a map of the harbor lines of Charleston recently the greater part of the creek was surveyed. To complete the map and to make the estimates will require $300. It is recommended that this allotment be made.

Letters from the firms engaged in manufacture on this stream are appended.

Very respectfully,

G. P. HOWELL,
Captain, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

OFFICE OF DIVISION ENGINEER, SOUTHEAST DIVISION,
Savannah, Ga., April 23, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army.

It is evident that the dredging in Shipyard Creek is a desirable thing to do and that it would be of decided advantage to the various industries established along the west bank of this creek, but whether the work is of a kind that should be undertaken by the General Government or should be left to the immediate beneficiaries is a question which requires consideration. There are localities existing in a great many of the harbors of the United States where the dock facilities could be greatly improved if the United States would deepen the water immediately in front of them, but this is not always done.

I think the matter is worthy of a survey to the extent proposed, and I would respectfully recommend the allotment of $300 for this purpose. When the exact nature of the work to be done and its probable cost is known, the question of who shall undertake it can better be discussed.

DAN C. KINGMAN,
Lieut. Col., Corps of Engineers,
Division Engineer, Southeast Division.

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[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., April 29, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

Shipyard Creek is a salt-water arm of Cooper River, which it enters at a point about three-eighths of a mile above Drum Island, and extends about 3 miles in a northerly direction. On its east side lies a salt marsh, part of the United States Naval Reservation, and the land on the west side just above its mouth is of similar character, but farther up are stretches of high land where, at favorable points, manufactories have been established. From an examination of the Coast Survey chart of Charleston Harbor it appears that the depths in Shipyard Creek vary from about 9 feet at the mouth to about 23 feet at several points above. The improvement desired is the dredging of a channel not less than 18 feet deep at mean low water, which will make the wharves of the manufactories accessible to the class of vessels now generally used in the lumber trade.

From the within report it appears that the commerce of this creek during 1906 amounted to 218,700 tons, valued at $545,000. This commerce is of sufficient importance to warrant careful consideration of the improvement of the waterway, and the Board therefore concurs with the district officer and the division engineer in recommending that an allotment of $300 be made for the preparation of a plan and estimate of cost.

Certain conditions appear to exist in this case which the Board believes should be carefully investigated and discussed by the district officer in his further report. Manufacturers usually seek cheap sites, and it rarely happens that such sites are situated on deep water of improved harbors. The dredging of channels by the United States for the benefit of a few private interests is generally considered of doubtful propriety, and where undertaken it should be clearly evident that the commerce is of such a general character as to be of public interest. In this connection attention is invited to the remarks hereon of the division engineer, with whom the Board concurs.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

[Fourth indorsement.]

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, May 2, 1907.

Respectfully submitted to the Secretary of War.

This is a report on preliminary examination of Shipyard River, South Carolina, authorized by the river and harbor act of March 2, 1907.

Inviting attention to the report of the Board of Engineers for Rivers and Harbors in the preceding indorsement, I recommend that preparation of plan and estimate of cost of improvement of the locality as proposed be authorized.

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

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[Fifth indorsement.]

WAR DEPARTMENT,
May 3, 1907.

Approved as recommended by the Chief of Engineers.

ROBERT SHAW OLIVER,
Assistant Secretary of War.

LETTER OF THE NORTH STATE LUMBER COMPANY.

CHARLESTON, S. C., *March 13, 1907.*

DEAR SIR: Replying to yours of March 5, we shipped 8,000,000 feet of lumber via vessel during the year. This lumber weighs about 4 pounds per foot and an average value of $18 to $18.50 per 1,000 feet.

The vessels we use draw from 9 to 13½ feet. We would like to use vessels drawing from 18 to 18½ feet that could get in and out at low water.

We can save on an average of 75 cents a thousand feet by using deep-draft vessels. Several months in the year it is almost impossible to get light-draft vessels to come south of Hatteras and all this time we are tied up on our shipments; all of this would be overcome if we could use deep-draft vessels.

Yours, very truly,

THE NORTH STATE LUMBER COMPANY,
G. J. CHERRY, *President and Manager.*

Capt. G. P. HOWELL,
Corps of Engineers.

LETTER OF THE A. C. TUXBURY LUMBER COMPANY.

CHARLESTON, S. C., *March 14, 1907.*

DEAR SIR: We are in receipt of your favor of the 5th instant relative to the amount of freight received and shipped through Shipyard Creek, and in reply we herewith make answer to your inquiries as follows:

Our receipts of logs amount to 81,000 tons valued at $162,000.

Our shipments of lumber amount to 9,700 tons valued at $85,000.

The draft of the vessels that handled this was a maximum of 13 feet.

The draft that we would like to use should not be less than 18 feet.

The probable saving to us per ton would be about 25 cents providing we could use a larger size vessel.

At present we have great difficulty in chartering vessels small enough to enter this creek, and frequently our orders have been delayed thirty to sixty days by reason of the fact of our inability to secure a small shallow-draft vessel, and as practically none of these vessels are being built and many lost by storms and otherwise we find the situation becoming more serious.

We are very glad indeed to see that action has been taken by the Government looking for a deepening of this channel and it will mean a great deal to the industries located upon it.

Truly, yours,

A. C. TUXBURY LUMBER COMPANY,
By F. G. DAVIES, *Vice-President.*

Capt. G. P. HOWELL.

LETTER OF THE ETIWAN FERTILIZER COMPANY.

CHARLESTON, S. C., *March 16, 1907.*

DEAR SIR: Replying to your esteemed favor of the 5th instant.

We receive by Shipyard Creek about 8,000 tons phosphate rock, which is delivered by barges carrying 150 to 200 tons each, drawing about 12 feet of water, which is about the greatest draft that it is safe to attempt owing to a bar formation at the mouth of the creek.

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Because of the want of sufficient water we have to receive at the city docks about 5,000 tons pyrites, 7,000 tons potash salts, and about 700 tons other material, all of which have to be discharged from vessels at city terminal and loaded in cars and transferred by railroad to our works, involving a charge of 50 to 60 cents per ton which could be saved if the vessels bringing goods could go direct to our works. We ship from our works in light-draft vessels (12 feet) about 4,000 tons manufactured fertilizers.

A depth of 20 feet minimum we think would meet the needs of our business.

Yours, very truly,

ETIWAN FERTILIZER CO.,
WM. J. MCCORMACK, *Treasurer.*

Capt. G. P. HOWELL,
Corps of Engineers.

PLAN AND ESTIMATE OF COST OF IMPROVEMENT OF SHIPYARD RIVER, OR CREEK, SOUTH CAROLINA.

UNITED STATES ENGINEER OFFICE,
Charleston, S. C., July 24, 1907.

GENERAL: 1. As directed in letter from the Chief of Engineers, May 9, 1907, I have the honor to submit the following report upon the plan and estimate of cost of the improvement of Shipyard River, South Carolina.

2. The channel to accommodate the traffic in this river—schooners towed by tugboats—should be 100 feet wide, and to allow schooners of 18-foot draft to use it, it should be 20 feet deep at high water or 15 feet at low water. It is not necessary that these schooners should go in and out at all stages of tide—they can easily wait till high water. The Board of Engineers for Rivers and Harbors is in error in stating in the third indorsement on the report of the preliminary examination of this stream that the improvement desired is the dredging of a channel not less than 18 feet deep at mean low water. The parties interested will be perfectly satisfied with a low-water depth of 15 feet.

3. The survey shows that the 15-foot depths occur only at pools at the bends, so that it will require almost solid dredging to form this channel. From the mouth in the Cooper River to the line marked *a-a* just above the plant of the A. C. Tuxbury Lumber Company—a distance of 3,050 feet—the number of cubic yards to be removed to form the 15-foot channel, with side slopes of 1 on 3, is 110,000 scow measurement (15 per cent increase over place measurement). At 20 cents per cubic yard, the cost would be $22,000.

4. There are no manufactories on the bank above the Tuxbury mill, but there are three excellent sites. To carry the 15-foot channel to the line *b-b*—1,100 feet—would include two of these sites, and the cost would be, 70,000 cubic yards at 20 cents, $14,000. The line *c-c* is above the third site, 600 feet above *b-b*, and the additional cost would be, 60,000 cubic yards at 20 cents, $12,000. Above *c-c* the creek wanders around through the surrounding marsh, by which it is eventually absorbed, and as no high land borders it, no improvement is necessary.

5. The question has been raised whether the dredging of such a channel for a few private interests should be undertaken, and to aid in this decision I have marked on the map the names of the owners of

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the adjacent land. The improvement now would affect only the Etiwan Fertilizer Company and the two lumber mills; but it would open up new sites for plants and would add to the general welfare of the port of Charleston. The Tuxbury plant has been established a little over a year and the North State Lumber Company about five or six years. The possibilities of this creek have just been recognized, and there is reason to believe that parties will seek sites here, as it is convenient to the railroads also. This creek is practically the continuation of the inner harbor of Charleston. * * *

6. * * * It is difficult for private parties to improve a navigable stream for their interests, unless they own the entire stream. The consent of the War Department must be obtained, and any objection on the part of any riparian owner is liable to cause the consent to be withheld. When the Tuxbury Lumber Company established its plant, it obtained the necessary permission to dredge in front of its property, and desired, besides, to dredge across the short bar between the creek and the Cooper River at the point where the proposed channel is now located. Some of the landowners on the west bank of the creek to the southward of this point objected on the grounds that the deepening of the upper mouth would cause less water to pass through the lower mouth, and that subsequent shoaling would take place in the channel in front of their property to their detriment. The permission was not granted. It would be almost impossible, therefore, for the mouth of the creek to be improved by these private interests unless the longer and more costly route were taken. * * *

7. As the land above the manufactories is now used solely for farming purposes, it is not now necessary to dredge the upper part of the creek; but it is recommended that the project for a 15-foot low-water channel be adopted for the entire stretch under consideration, at an estimated cost of $48,000, and that the portion up to and including the plant of the A. C. Tuxbury Lumber Company be first improved, at an estimated cost of $22,000, the remaining portions to be improved when the commercial interests require it.

8. It is estimated that the annual cost of maintenance will not exceed $2,500.

Very respectfully,

G. P. HOWELL,
Captain, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

OFFICE OF DIVISION ENGINEER, SOUTHEAST DIVISION,
Savannah, Ga., July 31, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army.

I am of the opinion, based upon the within report, that Shipyard River, South Carolina, is worthy of improvement by the United States to the extent proposed by the district officer.

DAN C. KINGMAN,
Lieut. Col., Corps of Engineers,
Division Engineer, Southeast Division.

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[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., August 19, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

The district officer submits within a report on survey, with estimate of cost of improving Shipyard River by dredging. The plan provides for a cut between Cooper River and Shipyard River about 2,000 feet above the natural mouth of the latter, through shoal water, where, from natural causes, a breach through the narrow, marshy neck has formed and which if enlarged as proposed will transfer the mouth of the river to the point of cut.

This stream has been partially improved by private interests, who, under date of December 23, 1905, submitted a petition asking authority to dredge a cut similar to that now proposed. This request was not granted on account of objections from interests located on Shipyard River below the point of the proposed cut, it being claimed that the work would result in shoaling in that part of the river below the cut.

With a view to securing further information before submitting its final report on this subject, the Board recommends that these papers be returned to the district officer with request that he submit an alternative plan and estimate for the improvement of the river, following its natural course to its present mouth, and closing the breach if this be deemed necessary and advisable, and also that he investigate and report upon any objections that may now be urged against the plan proposed involving a new mouth.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

[Fifth indorsement.]

UNITED STATES ENGINEER OFFICE,
Charleston, S. C., October 3, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

(*a*) The estimate for the channel following the natural course to the present mouth requires the substitution of the amount of dredging in the natural channel for that in the breach, which increases the item of paragraph 3 of the within report of Captain Howell from $22,000 to $48,000, the same unit prices and method of measurement being used. The estimates for work above this point as given in paragraph 4 remain unchanged.

(*b*) Comparison of surveys shows that the breach has changed from a width of 300 feet with a shoal bare at low water in the middle in 1894 to a width of 600 feet with a maximum depth of 1.8 feet at low water in the middle in 1906.

There is thus shown a natural tendency for the breach to widen and deepen slowly, though this tendency would be lessened by the opening of a larger channel for tidal flow by the dredging of the natural channel.

The estimated cost of a riprap embankment to close this breach is $24,000. It is believed that its construction should be deferred until

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further enlargement of the breach under the new conditions shows it to be necessary.

(c) Attached hereto is a copy of a circular letter sent to all property owners concerned, and copies of the replies thereto, objection being made to opening the breach by the representatives of the Kennerty estate.

E. R. STUART,
Captain, Corps of Engineers.

(Through the Division Engineer.)

[Sixth indorsement.]

OFFICE OF DIVISION ENGINEER, SOUTHEAST DIVISION,
Savannah, Ga., October 4, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army.

If the contentions of the riparian owners along this creek are likely to force the United States to adopt the longer and more expensive route for improvement, so as to make the cost nearly $50,000, I am of the opinion that it would be better to defer action for a time.

It may be that changes, due to natural forces, will settle the question itself; or if not, the various owners may adjust their differences so as to permit of the cheaper form of improvement.

DAN C. KINGMAN,
Lieut. Col., Corps of Engineers,
Division Engineer, Southeast Division.

[Eighth indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., October 14, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

The district officer presents within an estimate of cost for the improvement of Shipyard River in the sum of $48,000, involving dredging and a new outlet into Cooper River. While he recommends the project as a whole, he is of opinion "that the portion up to and including the plant of the A. C. Tuxbury Lumber Company be first improved at an estimated cost of $22,000, the remaining portions to be improved when the commercial interests require it."

In third indorsement hereon the Board requested, on account of possible objections by riparian owners to the plan proposed for changing the mouth of the river, that an estimate be submitted for the improvement of the stream following its natural course to its present mouth, and closing the breach at the proposed cut if this be deemed necessary and advisable, and also asked that the district officer investigate and report upon any objections that may be urged against the plan proposed involving a new mouth.

From his further report it appears that the cost of the improvement by following the present course of the stream instead of the cut-off will be $48,000, instead of $22,000 for the lower stretch of the improvement, making the entire dredging of the stream $74,000, as against $48,000, originally estimated. The closing of the breach is estimated to cost $24,000, but the district officer believes that this part of the work should be deferred until further development makes its necessity more apparent. While it is possible that this closure

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may never be required, it is not improbable that it will be, and therefore its cost should be taken into consideration. This would make the entire cost of the improvement following the present course of the stream $98,000.

It appears from one of the communications from interested parties with reference to the proposed change in the mouth of the river, that vigorous objection is made by some of the riparian owners to the plan proposed, it being claimed that its execution will result in deadening the flow through that part of the river below the proposed new mouth, which would cause it to fill. In view of the lack of unanimity of opinion in the locality in regard to the plan proposed and the opposition with which the prosecution of the work may be met, the Board believes it would not be advisable to undertake the plan proposed by the district officer involving a new mouth.

The question is then presented as to the advisability of improving the stream to its natural mouth at an estimated cost of $74,000, with a possible further expenditure of $24,000 for the closure of the breach, of which total sum $48,000 is required for immediate expenditure on the lower section. When the amount and character of the commerce are taken into consideration, coupled with the fact that the probable benefits will extend only to a few interests, the cost involved in this plan appears excessive and out of reasonable proportion to the advantages to accrue to general commerce.

Summing up, the Board believes it inadvisable under all the circumstances to undertake the improvement of this stream, at least until such time as, through natural forces, a new mouth in the vicinity of the proposed cut is formed, or until no serious objection to the cut-off plan is urged by riparian owners.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

CIRCULAR LETTER OF CAPT. E. R. STUART, CORPS OF ENGINEERS, SENT TO VARIOUS INTERESTED PARTIES.

WAR DEPARTMENT,
UNITED STATES ENGINEER OFFICE,
Charleston, S. C., September 20, 1907.

DEAR SIR: Captain Howell, Corps of Engineers, recently submitted a report recommending the dredging of Shipyard Creek and the deepening of the natural break from this creek into Cooper River lying about east from Etiwan Phosphate Company's works, instead of dredging through to the natural mouth of the creek.

I have been directed by the Chief of Engineers to get the opinions of those owning property on that portion of this creek below the designated break as to the effect of this change in the outlet.

Do you think that the property which you own or represent will be injured by the making of the cut at the point indicated; and if so, do you object to this plan of improvement? Should you object, please state the grounds of your objection. Your early reply to this communication will be appreciated.

Very respectfully,

E. R. STUART,
Captain, Corps of Engineers.

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LETTER OF MESSRS. FICKEN, HUGHES AND FICKEN.

FICKEN, HUGHES AND FICKEN,
ATTORNEYS AND COUNSELLORS,
Charleston, S. C., September 21, 1907.

DEAR SIR: We beg to acknowledge your favor of the 20th instant addressed to our senior, relative to the recommendation of Captain Howell that an opening into Shipyard Creek be dredged into the Cooper River at a point east of the Etiwan phosphate works, instead of dredging the said creek through to its natural mouth.

We represent the Kennerty estate and the Alliance Realty Company, who, together, we are informed, own all of the high land on that portion of said creek which lies below the proposed artificial opening.

Our clients have carefully considered the matter, and are of the opinion that their property will be materially injured if the dredging is made at the point indicated instead of dredging the natural channel of the creek, and we take this opportunity in their names of protesting against the proposed artificial change of the channel recommended by Captain Howell.

Among other objections which our clients have to the project is that owing to local conditions the present mouth of the creek will shoal up in a short time, and our clients will be put to the expense of obtaining damages from the Federal Government for injury to their water front, and be seriously inconvenienced in the interim.

Our clients further state that they can see no reason why the channel of the creek should be changed excepting for the benefit of certain people whose lands lie near the head of the creek, and who are trying to get the Government to render their lands more valuable by obtaining an artificial opening into the creek.

Permit us to thank you for your courtesy in the premises.

Yours, truly,

FICKEN, HUGHES & FICKEN,
By H. H. F.

Capt. E. R. STUART,
War Department,
United States Engineer Office.

WATER OF THE CHARLESTON COUNTRY CLUB.

CHARLESTON, S. C., *September 21, 1907.*

DEAR CAPTAIN: Replying to yours of the 20th instant, would say that all the water front of the Charleston Country Club is owned by Magnolia Cemetery. If there is any further information that I can give you in regard to same, I shall be pleased to do so.

Yours, truly,

THOS. S. SINKLER,
President Charleston Country Club.

Capt. E. R. STUART,
Corps of Engineers.

LETTER OF THE ETIWAN FERTILIZER COMPANY.

CHARLESTON, S. C., *September 23, 1907.*

DEAR SIR: We beg to acknowledge receipt of your esteemed favor of 20th instant, and contents have our careful attention.

We do not think that the deepening of the natural break from Shipyard Creek into Cooper River at a point about opposite our works would injure our property, and, on the contrary, we think it would be of great benefit to us, and we would be very glad to see this work done.

Yours, respectfully,

ETIWAN FERTILIZER CO.,
WM. J. MCCORMACK, *Treas.*

Capt. E. R. STUART,
Corps of Engineers.

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LETTER IN BEHALF OF THE MAGNOLIA CEMETERY.

CHARLESTON, S. C., *September 25, 1907.*

DEAR SIR: Replying to your favor of the 20th, would say in behalf of Magnolia Cemetery that we have no objection to the work which you contemplate doing in the creek leading into the Cooper River, lying about east of Etiwan phosphate works.

Thanking you for your consideration,

Yours, truly,

HENRY P. WILLIAMS,
President Magnolia Cemetery.

Capt. E. R. STUART,
Corps of Engineers.

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ST. CLAIR RIVER, MICHIGAN.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORTS OF EXAMINATION AND SURVEY OF CHANNEL IN ST. CLAIR RIVER, MICHIGAN, BETWEEN RUSSELL ISLAND AND GRAND POINT.

JANUARY 6, 1908.—Referred to the Committee on Rivers and Harbors and ordered to be printed with accompanying illustrations.

WAR DEPARTMENT,
Washington, December 23, 1907.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated 19th instant, together with copies of reports from Col. Chas. E. L. B. Davis, Corps of Engineers, dated April 22 and November 26, 1907, of a preliminary examination and survey, respectively, of channel between Russell Island and Grand Point in the St. Clair River, Michigan, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 19, 1907.

SIR: I have the honor to submit herewith for transmission to Congress reports of April 22, 1907, and November 26, 1907, with maps, by Col. Chas E. L. B. Davis, Corps of Engineers, on preliminary examination and survey, respectively, authorized by the river and harbor act approved March 2, 1907, of channel between Russell Island and Grand Point in the St. Clair River, Michigan.

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The improvement contemplated has for its object the creation of an auxiliary channel for the convenience of local and general commerce. The plan recommended provides for a channel 300 feet wide and 20 feet deep at an estimated cost of $100,000, including price of right of way.

I concur in the opinion of the district officer and the Board of Engineers for Rivers and Harbors that this locality is worthy of improvement in the manner indicated above.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF CHANNEL IN ST. CLAIR RIVER, MICHIGAN, BETWEEN RUSSELL ISLAND AND GRAND POINT.

WAR DEPARTMENT,
UNITED STATES ENGINEER OFFICE,
Detroit, Mich., April 22, 1907.

GENERAL: Pursuant to instructions contained in Department letter of March 14, 1907, I have the honor to submit the following report on a preliminary examination of "channel between Russell Island and Grand Point in the Saint Clair River."

Russell Island is situated in the delta of the St. Clair River where the main stream divides into two branches, called the North channel and the South channel, the latter being the one used by commerce.

The channel is narrow at the head of the shoal extending northeasterly from Russell Island, and many collisions have occurred at this point. Mr. C. C. Smith, of Algonac, member of a firm of boat builders, writes me—

That the channel between the head of Russell Island and Walpole Island has been the scene of more dangers and collisions in the past ten years than any other spot on the St. Clair River. There have been several collisions at this point. The barge *Sage* was sunk there, the barge *Champion*, the steamer *Bethlehem*, and two or three others that I don't recall.

I have marked on the accompanying tracing [a] the course of a steamer bound for Algonac. The full black lines show by the direction of arrows the present course of up-bound and down-bound vessels, the loop in the North channel being necessary in order that the vessel when leaving her wharf shall be headed in the proper direction. On the same tracing I have indicated the approximate location of the proposed channel, and show by dotted lines and direction of arrows the courses of up and down bound vessels through the new route. These courses will avoid the necessity of the loop, and the actual saving on each trip will be about 6,000 feet.

Mr. B. W. Parker, general manager of the White Star Line of steamers, in letter of March 11, 1907, writes me of their business for the season of 1906, as follows:

Our steamer *City of Toledo* made 217 landings at Algonac and carried to and by the town 90,237 people, the steamer *Greyhound* made 16 landings and carried 15,911 people, steamer *Tashmoo* made 182 landings and carried 137,421 people, and the

[a] Not printed.

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steamer *Owana* made 244 landings and carried 30,658 people; a total of 659 landings at the port of Algonac with our four steamers and carried passengers to and by the town to a total of 274,227 people.

The new proposed channel would mean a saving on the 659 trips of nearly 750 miles during the season, and would avoid the point where accidents are so liable to occur, thus greatly diminishing the chances of a collision with one of these passenger steamers with its attendant loss of many lives.

I append a copy of Mr. Parker's letter[a] with his list[a] of vessels that trade through the St. Clair River and would be likely to use the proposed new channel.

For reasons given I regard the improvement of this channel as worthy of being undertaken by the General Government provided it can be done at a reasonable cost, and to determine this point I recommend that a survey be made and an estimate of the cost of dredging a channel of proper width and depth, borings being made to determine the character of the material within the limits of depth. The estimated cost of such survey is $800.

Very respectfully, your obedient servant,

CHAS. E. L. B. DAVIS,
Colonel, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.

[Second indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., April 29, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

Based on the present information which is contained in the within report and its accompanying letter, it is believed that the proposed channel between Russell Island and Grand Point would be of considerable value to the navigation interests of St. Clair River, both in the saving of time and in lessening the dangers of collision, and the advisability of its construction would appear to hinge upon its probable cost. This the district officer states can be determined by a survey at an expense of $800. The expenditure of this sum to secure further information on which to base a final opinion as to the advisability of the United States undertaking the improvement appears to be fully justified. The Board therefore recommends that the survey be authorized.

The number of vessels reported as likely to make use of the proposed channel if constructed is 123. It appears, however, that the greatest interest in this channel is confined to one navigation company which at one time contemplated creating the channel for its own use. It is recommended that these special interests be fully investigated and the advisability of their bearing a part of the expense of the work considered.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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[a] Not printed.

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[Third indorsement.]

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, May 2, 1907.

Respectfully submitted to the Secretary of War.

This is a report on preliminary examination of channel between Russell Island and Grand Point in St. Clair River, Michigan, authorized by the river and harbor act of March 2, 1907.

Inviting attention to the report of the Board of Engineers for Rivers and Harbors, in the preceding indorsement, I recommend that a survey of the locality, as proposed, be authorized.

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

[Fourth indorsement.]

WAR DEPARTMENT,
May 3, 1907.

Approved as recommended by the Chief of Engineers.

ROBERT SHAW OLIVER.
Assistant Secretary of War.

SURVEY OF CHANNEL IN ST. CLAIR RIVER, MICHIGAN, BETWEEN RUSSELL ISLAND AND GRAND POINT.

WAR DEPARTMENT,
UNITED STATES ENGINEER OFFICE,
Detroit, Mich., November 26, 1907.

GENERAL: In accordance with instructions contained in Department letter of May 9, 1907, I have the honor to submit the following report upon the survey of the "channel between Russell Island and Grand Point in the Saint Clair River."

The report upon the preliminary examination of this channel was submitted April 22, 1907, to which attention is respectfully invited.

During the month of June, 1907, 15 holes—3 in the South, or main, channel, 4 in the North channel, and 8 across the land, as shown on accompanying chart—were bored with a water jet, no drilling being necessary. The material was sand and clay in all of the holes except two of those on the island, in which a seam of gravel was struck at 18 feet and 12 feet, respectively, from the surface. The seam appeared to be about 4 feet thick, below which was mostly clay, there being but very little sand. No bowlders or hardpan were found in any of the holes.

Estimates have been made of the cost of securing channels of widths of 100, 200, and 300 feet with a uniform depth of 20 feet with side slopes of one and a half on one.

Estimates.

Channel width 20 feet deep.	Cubic yards.	Cost, 12 cents per cubic yard.
100	263,638	$31,633
200	463,297	55,596
300	664,112	79,693

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The main channel to the eastward of Russell Island being somewhat narrow, has been the scene of many collisions and a number of narrow escapes. The proposed cut would make a double channel for a distance of two and one-half miles, would relieve the present congested condition of the main channel and would materially lessen the dangers of navigation.

The navigation company that would be most directly benefited by the proposed cut is the White Star Line, operating three large passenger and freight steamers touching six times a day at Algonac. The proposed cut would do away with the long loop around the head of Russell Island, shown on the accompanying map, which these steamers, and other vessels stopping at Algonac, are now obliged to make. This turn right on the line of through traffic where the main channel narrows to less than 1,000 feet, is particularly dangerous, as in making this sharp turn the rudder chains are subjected to a very severe strain, the breaking of which might result in a collision with great loss of life, the White Star Line during the season of navigation carrying nearly 300,000 passengers. The *Tashmoo*, one of their steamers, has carried on several occasions her full licensed capacity of 3,500.

I recommend the excavation of a channel 300 feet in width and 20 feet deep, as shown on chart, costing approximately $80,000. As 300 feet is the minimum width of dredged cuts in the main ship channel between Chicago, Duluth, and Buffalo, I recommend that width, as I think many down-bound vessels will find it to their advantage to use this channel. I recommend 20 feet depth because that is the depth at the St. Clair Flats Canal. The constant passage of vessels loaded to nearly the entire depth of water in the canal has been found to have a decided tendency to deepen the channel and in the soft material in the proposed cut I have no doubt the same tendency will be developed, so that the cost of maintenance will be merely nominal, not to exceed say 2 per cent per annum of the original cost.

In the letter of instructions my attention was invited to the recommendation of the Board of Engineers for Rivers and Harbors, that as the greatest interest in this channel is confined to one navigation company, which at one time contemplated making a channel for its own use, these special interests be investigated and the advisability of this company bearing part of the expense be considered.

This company having been approached on the subject took the ground that the new channel would be of advantage to commerce generally and did not think their company ought to contribute. After a good deal of deliberation on the subject, I have come to the conclusion that this new channel, by materially lessening the dangers of collisions, will contribute to the general safety of commerce as well as be of great advantage to the company referred to, and for this reason I have recommended a channel in location, width, and depth that will best subserve the interests of general traffic. A narrower and shorter channel of much less draft on the line of the Canoe Cut would answer the purposes of the White Star Line. The letter of the company is appended hereto.

After considerable delay I have succeeded in obtaining from the owners of the land through which the proposed cut is to be made an offer that seems to be reasonable, viz, the second one in the appended

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letter of Mr. Burt D. Cady, an attorney of Port Huron, Mich., representing the property owners, and I recommend its acceptance. This will secure all the land between the Canoe Cut and the Grand Point Dredge Cut for the sum of $10,000, not including the seven lots referred to by Mr. Cady.

I think it will be much better to take the whole of the small island between the cuts rather than the strip of land 500 feet wide, as future developments of lake traffic may require a further deepening and widening of this channel.

As to the reasonableness of the offer, I have to say that $30,000 was offered a few years ago for all the portion of Russell Island above the Canoe Cut, containing about 131 acres, or at the rate of $229 per acre. The area recommended for acceptance amounts to about 49 acres, which at the above figure would amount to $11,221. The price offered does not therefore appear to me to be excessive. This $10,000 for the land will bring the total estimate up to $100,000, in round numbers, including about 10 per cent for contingencies.

Very respectfully, your obedient servant,

CHAS. E. L. B. DAVIS,
Colonel, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.

[Second indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., December 2, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

In the within report the district officer submits plans for constructing a channel 20 feet deep connecting the North and South channels of St. Clair River between Herson Island and Russell Island, in the vicinity of Algonac, Mich. The cost of a channel 100 feet wide is estimated at $31,633, one 200 feet wide at $55,596, and one 300 feet wide at $79,693. While either of the smaller channels proposed would probably serve the needs of the local passenger business to and from Algonac, in which one line of steamers is principally interested, the district officer believes that a channel 300 feet wide will be of some benefit to through commerce on the St. Clair River, and for this reason he recommends its adoption.

Under existing conditions vessels bound to or from Algonac must make a rather difficult turn at the head of Russell Island, directly on the main line of through traffic, where the channel narrows to less than 1,000 feet. The proposed cut would provide a route affording access to Algonac for both upstream and downstream traffic, obviating the necessity for making the turn at the head of Russell Island, which is not only dangerous for vessels bound to or from Algonac, but likewise involves equal risk of collision to vessels engaged in through commerce. Viewed as an improvement for the sole benefit of the local traffic at Algonac, the advisability of the work would appear doubtful, but the report of the district officer makes it clear that the provision of a channel suitable to the needs of general commerce will be a work fully justified by the measure of safety it will afford at this point to the constantly growing and often congested through navigation of the St. Clair River.

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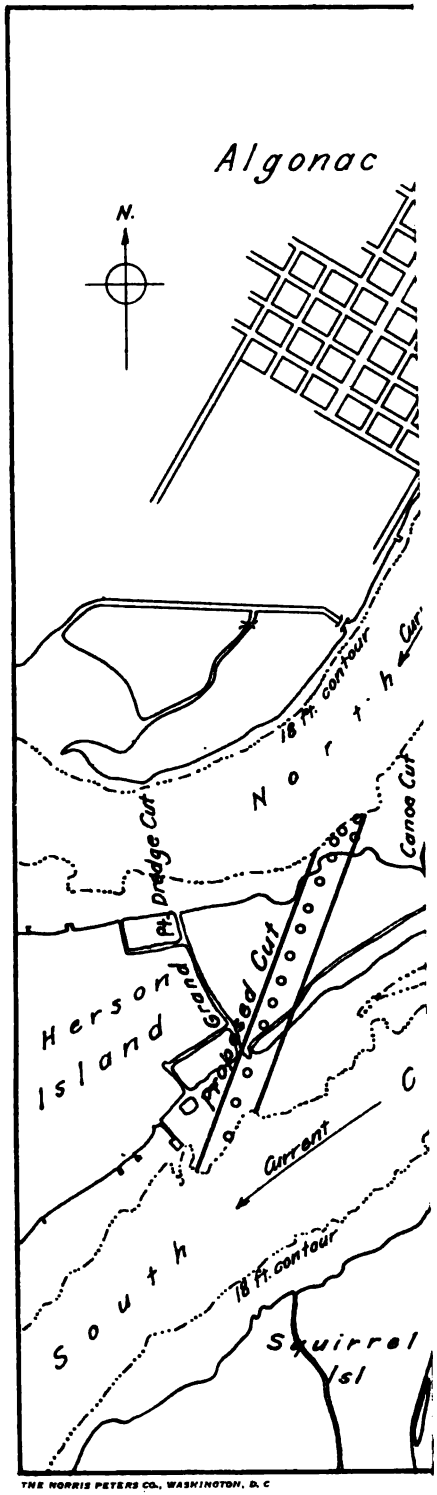

THE NORRIS PETERS CO., WASHINGTON, D. C

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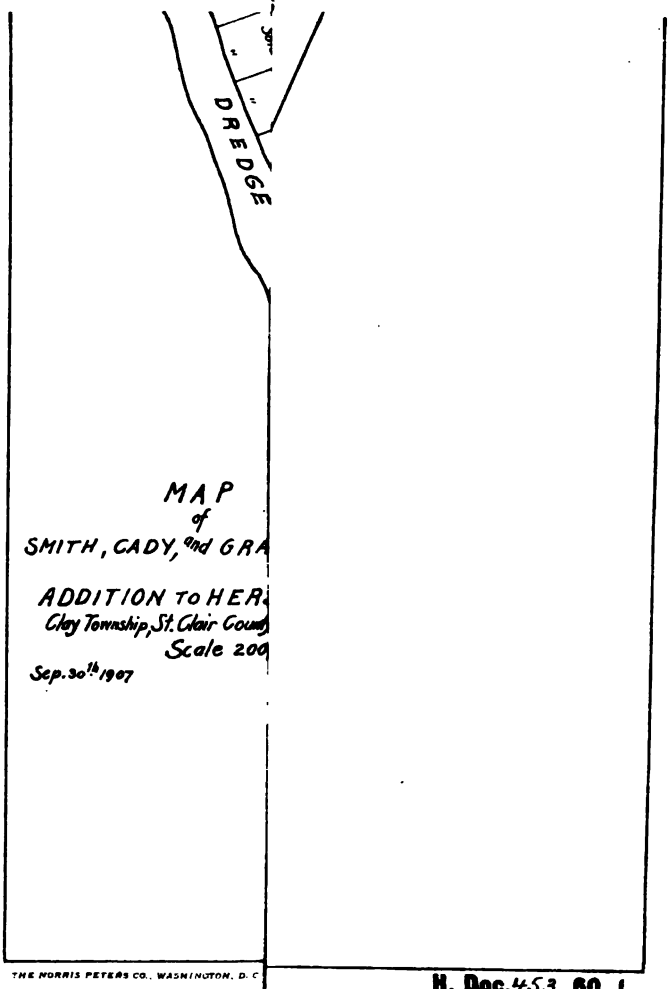

THE NORRIS PETERS CO., WASHINGTON, D. C.

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In view of the above, the Board recommends approval of the project contained within for excavating between Russell Island and Herson Island a channel 300 feet wide and 20 feet deep at a cost of approximately $100,000, including 10 per cent for contingencies and $10,000 to cover the cost of land needed for the necessary right of way.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

LETTER OF THE WHITE STAR LINE.

WHITE STAR LINE,
Detroit, Mich., July 24, 1907.

DEAR SIR: Replying to your favor of the 23d:

We at one time did contemplate running a private channel between Herson Island and Russell Island. This channel was to be 160 feet wide by 12 feet deep. The earth from the same was to redeem about 40 acres of land, which we figured we could plat and sell, revenue of which would very nearly cover the expense of digging the channel. Due to a flaw in the title we dropped the matter.

As general aids to navigation, we believe this channel should be put through, and we don't believe that we should be called upon to contribute. A great deal of money is being wisely spent for the aids to navigation, wholly for the benefit of the coarse freighters and tramp ships, and, as the *City of Detroit* alone carried over seven and a half million people from this port in 1906, our four steamers carrying over one-half a million people, sincerely believe that some money should be spent for the aids to navigation of passenger steamers to lessen the liability of collision, and I know of no place on the lakes where a little money could be better spent to lessen the liability of collision than at the point mentioned. Perhaps not all the large down-bound ore carriers would use the new channel, but all the small freighters and passenger boats would, thereby lessening the liability of collision, of which there has been many in and about Russell Island, St. Clair River.

I do hope that there will be no delay in putting this channel through so that it will be ready for us before the rush of business of another excursion season.

May I have a copy of the proposed channel and very much oblige,

Yours, very truly,

B. W. PARKER,
General Manager.

Col. CHAS. E. L. B. DAVIS.

LETTER OF BURT D. CADY.

CADY AND CRANDALL,
ATTORNEYS AT LAW,
Port Huron, Mich., November 12, 1907.

SIR: On November 5 I wrote you stating that I would take up the question of reduction of price of land needed by the United States for dredging of channel for purposes of navigation across Russell Island with the several owners of the land. I have just been able to see them and am now authorized to make you the following propositions:

(1) We will accept $4,000 for a strip 500 feet wide in the line of the proposed cut as shown on the accompanying sketch, with the understanding that the dirt taken from the cut will be deposited upon the adjoining land on both sides of said cut, the same to be spread as near a uniform level as possible.

(2) We will accept $10,000 for all land between the two cuts—that is, between the Canoe Cut on the north and Grand Point Dredge Cut on the south, excepting seven lots 60 feet by 200 feet each, which we have sold, as is shown by the accompanying sketch.

I hope that these propositions will meet with your favorable consideration.

Very truly, yours,

BURT D. CADY.

Col. CHARLES E. L. B. DAVIS.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 463.

HEMPSTEAD HARBOR, NEW YORK.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF HEMPSTEAD HARBOR, NEW YORK.

JANUARY 9, 1908.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, January 8, 1908.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated January 7, 1908, together with copy of a report from Col. John G. D. Knight, Corps of Engineers, dated September 4, 1907, of a preliminary examination of Hempstead Harbor, New York, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

WM. H. TAFT,
Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, January 7, 1908.

SIR: I have the honor to submit herewith for transmission to Congress report of September 4, 1907, by Col. John G. D. Knight, Corps of Engineers, on preliminary examination authorized by the river and harbor act approved March 2, 1907, of Hempstead Harbor, New [illegible] with a view to obtaining a depth of 6 feet.

[illegible]e facts and for the reasons given I concur in the opinion [illegible] officer and the Board of Engineers for Rivers and

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Harbors that Hempstead Harbor is not worthy of improvement by the General Government.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF HEMPSTEAD HARBOR, NEW YORK.

UNITED STATES ENGINEER OFFICE,
New York City, September 4, 1907.

GENERAL: I have the honor to submit the following report upon a preliminary examination of Hempstead Harbor, with a view to obtaining a depth of 6 feet, made in compliance with Department letter dated March 14, 1907, and pursuant to the requirements of the river and harbor act of March 2, 1907, of which the following is an extract: "Hempstead Harbor, with a view to obtaining a depth of six feet."

Attention is invited to charts 116 and 366 of the United States Coast and Geodetic Survey and to the topographical chart of the United States Geological Survey, covering the Oyster Bay quadrangle, New York-Connecticut.

The average rise of tide in the harbor is 7.2 feet.

A report upon a survey and examination of this harbor was printed in House Executive Document No. 48, Forty-sixth Congress, third session, and reprinted without appendixes on pages 668–671, Part 1, Report of the Chief of Engineers, U. S. Army, 1881.

An examination of this harbor was made by me August 31, 1907.

Bar Beach divides Hempstead Harbor into an outer and inner harbor. In the outer more than 6 feet depth is to be found in the channel; hence we are concerned only with the inner.

In that a narrow channel of the proposed depth follows the eastern shore about one-third the length of the inner harbor and connects with a central body of equal or greater depth. On the west bank are six or seven sand wharves, two of which have just been built; at these laden barges ground at low water, but may be drawn out and anchored in the middle pool until made up into a tow. From these wharves and another in the outer harbor it is reported that ten barges of sand are removed daily.

At the head of the harbor on the east shore is a public wharf, part of which is leased and is used for storage of coal. On it were about 2,400 tons, valued at $13,000. From the chart it may be seen that at but one place does a sounding of less than 6 feet interfere with access to this wharf.

At the extreme head of the harbor is a narrow creek extending up to a dam. On each side of this creek is stored lumber and on the east side coal. Much of the lumber is rafted from vessels in the harbor up into the creek. The commerce in lumber and coal in this creek for this year will amount to about 3 schooners and 11 barges of lumber and 18 barges of coal, all but 1 schooner and 1 barge load of lumber having been delivered. The total is 1,800,000 feet of lumber and 3,500 tons of coal, valued at $112,000. The saving on water

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transportation over railroad and hauling from station is reported as from $1 to $2 on lumber and about 75 cents per ton on coal; the lumber, moreover, is delivered by rail in better condition than when rafted and poled through dirty water for final delivery.

But this creek goes nearly dry at low water and on its banks at the upper end are timber bulkheads in bad decay. The creek is hardly wide enough to admit a dredge, certainly not a dredge with scow alongside to receive dredged material. Were it dredged for a width of more than 20 feet the bulkheads and underlying mud would doubtless cave in.

A steamboat is run week days by the New York and Long Island Railroad Company during a season of six months between New York, South Glenwood, and way landings, and carries considerable fruit from South Glenwood.

Hempstead Harbor is free from ice nine or ten months of the year.

The expense of making the channel under consideration is not warranted by the commerce of the harbor, and I consider Hempstead Harbor not worthy of improvement by the General Government.

Very respectfully, your obedient servant,

JOHN G. D. KNIGHT,
Colonel, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.

[Second indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., December 30, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

In view of the narrowness of the creek at the head of the bay and the fact that the improvement of such a small waterway by the United States, the benefits of which would be principally local, appears to be of doubtful propriety, coupled with the belief that the cost of the improvement would not be justified by the probable resulting advantages to commerce, it does not appear necessary to further consider this phase of the improvement.

With reference to the upper or inner harbor proper, it is reported that a depth of 6 feet, that contemplated in the present inquiry, is practically available now, with the exception of one or two places where it may be slightly less.

The commerce involved is not very large, and it appears that the advantages to be gained by providing the slight increase to 6 feet in depth would not be sufficient to justify the expense of the work. The Board therefore concurs with the district officer in reporting the improvement of Hempstead Harbor by the General Government as inadvisable at this time.

Interested parties having been invited by the district officer to submit statements to the Board, one communication in behalf of the improvement has been received and given due consideration.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 464.

ST. JOSEPHS BAY, FLORIDA.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF ST. JOSEPHS BAY, FLORIDA.

JANUARY 9, 1908.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, January 8, 1908.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated January 7, 1908, together with copy of a report from Capt. H. B. Ferguson, Corps of Engineers, dated November 14, 1907, of a preliminary examination of St. Josephs Bay, Florida, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

WM. H. TAFT,
Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, January 7, 1908.

SIR: I have the honor to submit herewith a report dated November 14, 1907, by Capt. H. B. Ferguson, Corps of Engineers, on preliminary examination of St. Josephs Bay, Florida, authorized by the river and harbor act approved March 2, 1907. Captain Ferguson recommends a survey with a view to a possible improvement of the locality.

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From the facts and for the reasons given I concur in the opinion of the division engineer, Col. E. H. Ruffner, Corps of Engineers, and the Board of Engineers for Rivers and Harbors that St. Josephs Bay is not now worthy of improvement by the General Government; and therefore recommend that no survey be ordered at this time and that this report be transmitted to Congress.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF ST. JOSEPHS BAY, FLORIDA.

UNITED STATES ENGINEER OFFICE,
Montgomery, Ala., November 14, 1907.

GENERAL: I have the honor to submit the following report upon the preliminary examination of St. Josephs Bay, Florida, provided by the river and harbor act approved March 2, 1907:

St. Josephs Bay is on the coast of Florida, about 150 miles east of Pensacola. The bay has an area of some 50 square miles, 3 to 6 fathoms deep. The entrance across the bar has remained about 19 feet from first survey on hand (1875) to date.

There is at present no commerce nor town on this bay, but a railroad is now being built from Apalachicola, Fla., to St. Josephs Bay. The following letter, dated Apalachicola, Fla., November 8, 1907, from Mr. R. B. Coleman, general manager Apalachicola Northern Railroad, is quoted:

> Answering yours of the 29th ultimo, requesting information relative to St. Josephs Bay, Florida, will say that at present there is no commerce there, but this company has its line graded from Apalachicola to that point, which it hopes to complete in the near future, realizing the value of the harbor from a commercial point of view. The same interests owning this company have large holdings of lands at St. Josephs Bay, embracing the water front, and also have a large body of long-leaf yellow pine timber land through which this road runs. It is their intention to build wharves and docks at St. Josephs Bay and build a town there affording water transportation for timber products, as well as all other freight offered them.
>
> I do not know of any other road contemplating the use of this harbor, although a number of charters have been taken out with St. Josephs Bay as the objective point.

Owing to the peculiarly sheltered condition of this bay, it forms an excellent harbor of refuge and is used as such by fishing boats and other coastwise vessels which pass this point. The present depth at the entrance is sufficient for any of these boats and will probably be sufficient for the commerce of this port for several years to come. However, as this bay is perhaps one of the localities to be considered in selecting a deep-water harbor on this portion of the coast of Florida, I would respectfully recommend that $1,000 be allotted for the accurate survey of the entrance to this harbor. In this connection reference is respectfully made to indorsement by the Board of Engineers for Rivers and Harbors on report of examination of St.

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Andrews Bay, Florida, published in House Document No. 250, Fifty-eighth Congress, second session.[a]

Very respectfully,

H. B. FERGUSON,
Captain, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

OFFICE DIVISION ENGINEER, GULF DIVISION,
New Orleans, La., November 15, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army.

I am unable to concur in the opinion of the district engineer that a survey of St. Josephs Bay, Florida, is needed at the present time. It would seem that a depth of 19 feet, which is reported to be permanent, would accommodate all commerce possible in a locality having at the present time neither town, wharves, railroad, nor commerce. After some development occurs steps might well be taken to assist, but at present nothing is required.

E. H. RUFFNER,
Colonel, Corps of Engineers,
Division Engineer.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., December 23, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

In its present condition St. Josephs Bay offers almost unlimited facilities for the anchorage and shelter of vessels having a draft of 19 feet or less, and the area available for commercial development on its shores is very extensive, although believed to be low and swampy. The depth in the harbor itself ranges for the most part between 25 and 35 feet, with 19 to 19½ feet at the entrance. The adjacent country is sparsely populated, there being no towns or even small settlements on the shore of the bay.

There is no commerce at present originating here, and the only use made of the bay is as a harbor of refuge for passing vessels in time of storm. To some extent the harbor is sought for this purpose. The Apalachicola Northern Railroad Company has recently built a line from River Junction, a point on the Apalachicola River at the crossing of the Florida Central to the town of Apalachicola, about 20 miles east of St. Josephs Bay, and it is intended to extend the line to St. Josephs Bay and there establish a commercial port with wharves, docks, etc., for the transshipment of general commerce.

At the request of the Board those known to be interested were invited to submit their views in regard to the necessity and pr[illegible]

[a] Reprinted in Annual Report of the Chief of Engineers f[illegible]

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of the United States undertaking this improvement. The only reply received was from the Apalachicola Northern Railroad Company, whose road has not yet reached the shores of the bay. It would appear, therefore, that for the present at least there is no prospect for any commerce being handled at this locality, nor any demand for navigation facilities beyond those now existing.

In view of these facts, the Board reports that in its opinion, concurring with the views of the division engineer, it is not advisable for the United States at this time to undertake the improvement of St. Josephs Bay or to make a survey with that object in view.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 465.

CIVILIAN ENGINEERS.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A COMMUNICATION FROM THE CHIEF OF ENGINEERS, A STATEMENT OF CIVILIAN ENGINEERS EMPLOYED ON RIVER AND HARBOR WORK BETWEEN JULY 1, 1906, AND JUNE 30, 1907.

JANUARY 9, 1908.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, January 7, 1908.

SIR: In compliance with the provisions of section 8 of the river and harbor act of August 5, 1886, I have the honor to transmit herewith a letter from the Chief of Engineers, dated January 6, 1908, together with a statement prepared from data received from officers in charge of the different engineering districts, showing the name of each civilian engineer employed between July 1, 1906, and June 30, 1907, in the work of improving rivers and harbors, the time so employed, the compensation paid, and the place at and works on which employed.

Very respectfully,

WM. H. TAFT,
Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, January 6, 1908.

SIR: I have the honor to submit herewith, in obedience to the requirements of section 8 of the river and harbor act of August 5, 1886, a statement prepared from data received from officers in charge of the different engineering districts, showing the name of each civilian engineer employed between July 1, 1906, and June 30, 1907, in the work of improving rivers and harbors, the time so employed, the compensation paid, and the place at and works on which employed.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

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Statement showing name and place of residence of each civilian engineer employed between July 1, 1906, and June 30, 1907, under appropriations made by acts of Congress for the improvement of rivers and harbors, the time so employed, the compensation paid, and the place at and works on which employed.

Name and place of residence.	Time employed.	Compensation (per month).	Where employed.	Works on which employed.
	Mo. Da.			
F. S. Burrowes, Portland, Me	9 0	$175.00	Portland, Me	Harbor at Portland; Sasanoa and Kennebeck rivers, Me.; Cocheco River, N. H.
	3 0	200.00		
T. T. Hunter Harwood Rockport, Mass	1 15	200.00	Boston, Mass	Harbor of refuge at Sandy Bay, Cape Ann; harbors at Newburyport, Gloucester, Beverly, Lynn, Hingham, Provincetown, and Boston (including Chelsea Creek and Fort Point channel); Merrimac, Essex, Mystic, Malden, Weymouth Fore, and Weymouth Back rivers, Mass.; harbor at Burlington, Vt.; examinations and surveys.
	10 15	225.00		
Edward Parrish, Newport, R. I	12 0	250.00	Newport, R. I	Rivers and harbors on the coasts of Massachusetts and Rhode Island from Nantucket to Point Judith.
G. E. Verrill, New Haven, Conn	10 0	190.00	New Haven, Conn., and in the field	Harbors at Duck Island New Haven, Bridgeport, Branford, Milford, Norwalk, Fivemile River, Stamford, Southport, Greenwich, and Westport; Connecticut, Housatonic, and Saugatuck rivers, Conn.
	2 0	200.00		
Henry N. Babcock, Pelham Manor, N. Y	12 0	300.00	New York, N. Y	Harbor at New York; Bay Ridge, Red Hook, Buttermilk, and Gowanus Bay channels; enlargement of Governors Island, N. Y.
Glen E. Balch, New Brighton, N. Y	5 0	166.66	....do	Harbor at New York; Bay Ridge and Red Hook channels, N. Y.
	7 0	175.00		
H. B. Gorham, Rockville Center, N. Y	10 2	250.00	....do	River and harbor works in northeastern New Jersey and in New York.
	1 28	275.00		
J. H. Rostock, New York, N. Y	5 0	175.00	....do	Rivers and harbors in New York.
	7 0	200.00		
R. H. Talcott, Albany, N. Y	12 0	250.00	Albany, N. Y	Hudson River and harbors thereon, N. Y.
Thomas M. Farrell, Philadelphia, Pa	10 20	125.00	Philadelphia, Pa	Delaware River, Pa. and N. J.
Geo. W. T. Miller, Wilmington, Del	10 0	175.00	Wilmington, Del	Rancocas, Salem, and Cohansey rivers; Cooper, Mantua, Alloway, Raccoon, and Tuckerton creeks, N. J.; Appoquinnimink, Smyrna, Murderkill, St. Jones, Mispillion, and Broadkill rivers, Del.; examinations and surveys.
	2 0	192.50		
Henry Fox, Baltimore, Md	12 0	a 150.00	Baltimore, Md., and in the field	Patapsco River and channel to Baltimore, Md.
Samuel H. Yonge, Richmond, Va	12 0	250.00	Richmond, Va	James River, Va.
F. C. Warman, Washington, D. C	12 0	220.00	Washington, D. C., and in the field	All rivers and harbors in the Washington district, except James River, Va.
Wm. B. Harrison, Washington, D. C	12 0	170.00	....do	Do.
A. Von Siller, Washington, D. C	12 0	110.00	....do	Do.
Shirley Carter, Norfolk, Va	6 0	125.00	Norfolk, Va	Harbor at Norfolk, Va.; examinations and surveys.
S. F. Burbank, Washington, N. C	5 5	175.00	Wilmington and Newbern, N. C., and in the field.	Harbor at Beaufort; Beaufort Inlet; Neuse, Trent, Pamlico, Cape Fear, Tar, and New rivers; Scuppernong, Contentnia, and Fishing creeks; inland waterways from Pamlico Sound to Beaufort Inlet, from Newbern to Beaufort, from Beaufort Harbor to New River, from New River to Swansboro, N. C.; examinations and surveys.
R. C. Merritt, Wilmington, N. C	12 0	175.00	....do	All river and harbor works in the Wilmington district.

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James P. Allen, Charleston, S. C	12	0	200.00	Charleston, S. C	Rivers and harbors in the southern part of the district.
Reid Whitford, Georgetown, S. C	12	0	200.00	Georgetown, S. C	Winyah Bay, S. C., and rivers tributary thereto.
W. O. Whitescarver, Columbia, S. C	1	13	150.00	Columbia, S. C	Congaree River, S. C.
A. S. Cooper, Savannah, Ga	12	0	200.00	Savannah, Ga	Savannah Harbor and River, and Skidaway Narrows, Ga.
E. R. Conant, Brunswick, Ga	12	0	190.00	Brunswick, Ga	Cumberland Sound, Ga. and Fla.; harbors at Brunswick, Darien, and Doboy bar; Altamaha, Oconee, and Ocmulgee rivers; Club and Plantation creeks canal, Ga.; inland waterway, Savannah, Ga., to Fernandina, Fla.; harbor at Fernandina, Fla.
J. W. Sackett, Jacksonville, Fla	12	0	250.00	Jacksonville, Fla., and in the field	St. Johns River, Fla.; emergencies in river and harbor works.
F. W. Bruce, Jacksonville, Fla	12	0	175.00	....do	St. Johns River, Fla.; removing water hyacinths; examinations, surveys, and contingencies.
W. H. Caldwell, Tampa, Fla	12	0	200.00	Tampa, Fla., and in the field	Hillsboro and Tampa bays, Fla.
E. B. Thomson, Miami, Fla	11	10	175.00	Jacksonville, Fla	Biscayne Bay, Fla.
J. M. Braxton, Key West, Fla	10	0	175.00	Key West, Fla	Harbor at Key West, Fla.
J. E. Turtle, Pittsfield, Mass	10	0	250.00	Pensacola, Fla., and in the field	Harbors at Pensacola and Apalachicola Bay; Blackwater River, Carrabelle bar and harbor, Fla.; Escambia, Conecuh, and Choctawhatchee rivers, Fla. and Ala.
D. M. Andrews, Montgomery, Ala	9	1	175.00	Montgomery, Ala., and in the field	Coosa River, Ga. and Ala.; operating and care of canals, etc.; examinations, surveys, and contingencies.
	2	29	200.00		
Wm. L. Campbell, Montgomery, Ala	12	0	200.00	Mobile and Montgomery, Ala., and in the field.	Alabama River, Ala.; general office work.
F. H. Reed, Mobile, Ala	12	0	225.00	Mobile, Ala	Construction of locks and dams Nos. 1 and 2, Tombigbee River, Ala.
G. K. Little, Tuscaloosa, Ala	12	0	200.00	Tuscaloosa, Ala	Lock and dam construction on Black Warrior, Warrior, and Tombigbee rivers, Ala.
Chas. Humphreys, Mobile, Ala	4	17	250.00	Mobile, Ala	Harbors at Mobile, Ala., and Gulfport, Pascagoula, Horn Island, and Biloxi, Miss.; snagging on Warrior and Tombigbee rivers, Ala. and Miss.; Pearl, Pascagoula, Chickasahay, and Leaf rivers, Miss.
[illegible], New Orleans, La	12	0	300.00	New Orleans, La	Southwest Pass and South Pass channel of Mississippi River.
[illegible]quemine, La	12	0	200.00	Plaquemine, La	Bayou Plaquemine, La.
[illegible] Orleans, La	12	0	175.00	New Orleans, La., and in the field	Southwest Pass of Mississippi River; Bayou Teche, La.; examination of Bayou Terrebonne, La.
[illegible]ton, Tex	11	1	250.00	Galveston, Tex., and in the field	Harbor at Galveston; Galveston channel; Galveston ship channel and Buffalo Bayou; Aransas Bay and Pass; channel from Galveston to Texas City; channel to Port Bolivar; inland waterway on the coast of Texas; West Galveston Bay channel; Brazos and Trinity rivers; Anahuac channel; Cedar, Chocolate, and Bastrop bayous, Tex.
[illegible]	6	24	160.00	....do	Harbor at Galveston; Galveston ship channel and Buffalo Bayou; channel from Galveston Harbor to Texas City; West Galveston Bay channel; Aransas Pass and Bay; inland waterway along coast of Texas; Brazos and Trinity rivers; Anahuac channel; Cedar, Chocolate, and Bastrop bayous, Tex.
[illegible]	9	23	115.00	....do	Do.
[illegible]	11	29	175.00	....do	Harbor at Galveston; inland waterway along coast of Texas; West Galveston Bay channel; Brazos and Trinity rivers; Anahuac channel; Cedar, Chocolate, and Bastrop bayous, Tex.
[illegible]	11	22	150.00	....do	Brazos River, Tex.
[illegible]	10	13	125.00	Harrisburg, Tex., and in the field	Harbor at Galveston; Galveston ship channel and Buffalo Bayou; Brazos River, Tex.

* With subsistence while in the field.

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Statement showing name and place of residence of each civilian engineer employed between July 1, 1906, and June 30, 1907, etc.—Continued.

Name and place of residence.	Time employed. Mo.	Da.	Compensation (per month).	Where employed.	Works on which employed.
R. C. Smead, Dallas, Tex	9	8	$200.00	Dallas, Tex	Red River above Fulton, Ark.; Cypress Bayou, La., and Tex.; Trinity and Brazos rivers, Tex.
	2	22	225.00		
R. B. Gillette, jr., Dallas, Tex	9	8	115.00	Dallas, Tex., and in the field	Trinity and Brazos rivers.
	2	22	125.00		
Horace M. Marshall, Vicksburg, Miss	12	0	225.00	Vicksburg, Miss., and in the field	Red, Ouachita, and Black rivers, and their tributaries, La. and Ark.; Yazoo River and its tributaries, Miss.; preliminary examinations.
Thomas C. Thomas, Vicksburg, Miss	12	0	225.00	do	Ouachita River, Ark. and La.; Yazoo River at its mouth, Miss.
Leon E. Lion, Vicksburg, Miss	3	7	150.00	Vicksburg, Miss., and Algoma, Wis	Ouachita River, Ark. and La.; harbors on the western shore of Lake Michigan.
	2	13	175.00		
P. R. Van Frank, jr., Little Rock, Ark	12	0	175.00	Little Rock, Ark	Arkansas, White, and upper White rivers, Ark.; Black River, Ark. and Mo.; operating and care of canals, etc.; examinations, surveys, and contingencies.
Wm. Parkin, Little Rock, Ark	12	0	150.00	Batesville, Leiper, and Walls Ferry, Ark.	Upper White River, Ark.; operating and care of canals, etc.
W. C. Trigg, Little Rock, Ark	2	11	140.00	On dredge *Gamma*	Arkansas River, Ark.
Wm. S. Mitchell, St. Louis, Mo	5	0	225.00	St. Louis, Mo	Mississippi River between Ohio and Missouri rivers.
	7	0	250.00		
C. D. Lamb, St. Louis, Mo	5	0	200.00	do	Do.
	7	0	225.00		
W. M. Penniman, St. Louis, Mo	12	0	180.00	St Louis, Mo., and in the field	Do.
F. Y. Parker, St. Louis, Mo	12	0	180.00	do	Do.
M. Meigs, Keokuk, Iowa	12	0	250.00	Keokuk, Iowa, and in the field	Operating and care of Des Moines Rapids Canal and dry dock; Mississippi River from mouth of Missouri to St. Paul, Minn.
C. W. Durham, Rock Island, Ill	12	0	300.00	Rock Island, Ill., and in the field	Operating snag and dredge boats on the upper Mississippi and on Illinois River; Mississippi River from mouth of the Missouri River to St. Paul, Minn.
J. D. DuShane, St. Paul, Minn	12	0	250.00	St. Paul, Minn., and in the field	Mississippi River from mouth of Missouri River to St. Paul, Minn.
W. A. Thompson, La Crosse, Wis	12	0	250.00	La Crosse, Wis., and in the field	Do.
S. Edwards, Rock Island, Ill	12	0	200.00	Rock Island, Ill., and in the field	Do.
A. L. Richards, Rock Island, Ill	12	0	200.00	do	Do.
J. C. McElherne, Rock Island, Ill	12	0	200.00	do	Mississippi River from mouth of Missouri River to St. Paul, Minn.; operating and care of Galena River improvement and of western section of Illinois and Mississippi Canal.
M. G. Barnes, Rock Island, Ill	0	9	200.00	Rock Island, Ill	Mississippi River at Moline, Ill.
C. V. Brainard, Rock Island, Ill	3	0	175.00	do	Illinois and Mississippi Canal; Rock River pool, Ill.
A. O. Powell, St. Paul, Minn	1	10	250.00	St. Paul, Minn	Mississippi River between St. Paul and Minneapolis, Minn.; gauging waters of Mississippi River and its tributaries; general charge of the office as principal assistant in the absence of the officer in charge.
Geo. W. Freeman, St. Paul, Minn	11	0	225.00	do	Construction of Locks and Dams Nos. 1 and 2, Mississippi River between St. Paul and Minneapolis, Minn.

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R. Davenport, St. Paul, Minn.	12	0	200.00	.....do.....	Red River of the North, and its tributaries; Minnesota River; Warroad Harbor and River, Minn.; St. Croix River, Minn. and Wis.
Thomas Robinson, St. Paul, Minn.	12	0	175.00	Pine River Dam, Minn.	Reservoirs at headwaters of Mississippi River.
W. R. De Witt, Glasgow, Mo.	12	0	200.00	Sioux City, Iowa	Missouri River from mouth to Fort Benton, Mont.; Osage and Gasconade rivers, Mo.
John M. G. Watt, Chattanooga, Tenn.	12	0	200.00	Chattanooga, Tenn.	Chief civil assistant; all works in the district.
W. S. Winn, Kingman, Ala.	12	0	200.00	Muscle Shoals Canal, Ala.	Operating and care of Muscle Shoals Canal, Tennessee River.
C. A. Turrell, Cherokee, Ala.	12	0	a 150.00	Colbert Shoals Canal, Ala.	Operating and care of Colbert Shoals Canal, Tennessee River.
J. S. Walker, Nashville, Tenn.	12	0	200.00	Nashville, Tenn.	General engineering duties; lock construction on Cumberland River, Ky. and Tenn.
R. R. Jones, Cincinnati, Ohio.	12	0	250.00	Cincinnati, Ohio, and in the field	Ohio River harbor lines; constructing ice piers, dikes, and dams; Dam No. 37, Ohio River.
E. J. Carpenter, Cincinnati, Ohio	12	0	200.00	.....do.....	Ohio River dredging; plans for new dredging plant.
J. Nelson Caldwell, Cincinnati, Ohio	12	0	175.00	.....do.....	Do.
Wm. M. Hall, Parkersburg, W. Va.	12	0	220.00	Parkersburg, W. Va.	Dam No. 18, Ohio River; Little Kanawha River, W. Va.
Thomas E. Jeffries, Charleston, W. Va.	12	0	200.00	Charleston, W. Va	Kanawha River, W. Va.
William A. Christian, Congo, W. Va.	5	0	150.00	Congo, W. Va.	Dam No. 8, Ohio River.
	5	15	165.00		
Thomas P. Roberts, Pittsburg, Pa.	12	0	275.00	Pittsburg, Pa., and in the field	Operating and care of locks, dams, and pools Nos. 1 to 6; rebuilding Lock No. 2, and removing old Lock No. 2, Monongahela River, Pa.
John W. Arras, Coraopolis, Pa.	12	0	250.00	.....do.....	Allegheny River, Pa.; building Lock and Dam No. 2, and operating and care of Locks and Dams Nos. 1 and 3, Allegheny River, Pa., building Dam No. 2, and operating and care of Locks and Dams Nos. 1, 2, and 6, Ohio River, Pa.
Harry C. Gould, Pittsburg, Pa.	12	0	250.00	Pittsburg, Pa.	Harbor at Pittsburg, Pa.; establishment of harbor lines.
Wm. H. Chadbourn, jr., Beaver, Pa.	0	14	250.00	In the field	Building Locks and Dams Nos. 5 and 7, and operating and care of Dam No. 6, Ohio River, Pa.
John B. Dimmick, Pittsburg, Pa.	1	0	175.00	Pittsburg, Pa., and in the field	Building Davis-Neville Dam and Lock and Dam No. 2, Ohio River; Pa.; building Locks and Dams Nos. 2 and 3, and operating and care of Locks and Dams Nos. 1 and 3, Allegheny River, Pa.
	6	5	185.00		
	3	29	200.00		
James L. Callard, Morgantown, W. Va.	12	0	175.00	Morgantown, W. Va.	Operating and care of locks, dams, and pools Nos. 7 to 15, Monongahela River, Pa. and W. Va.
Anson B. McGrew, Beaver, Pa.	1	0	160.00	Beaver, Pa., and in the field	Building Locks and Dams Nos. 5 and 7, Ohio River, Pa.
	11	0	175.00		
Thomas E. L. Lipsey, Glenosborne, Pa.	3	29	150.00	Glenosborne, Pa.	Building Lock and Dam No. 3, Ohio River, Pa.
	3	29	175.00		
B. F. Thomas, Cincinnati, Ohio.	12	0	250.00	Cincinnati, Ohio	Kentucky River, Ky.; Muskingum River, Ohio; Big Sandy River, Ky. and W. Va.
Edmund Moeser, Zanesville, Ohio.	12	0	200.00	Zanesville, Ohio	Muskingum River, Ohio.
Albert M. Campbell, College Hill, Ky.	12	0	175.00	Cincinnati, Ohio, and in the field	Construction of Lock and Dam No. 11, Kentucky River, Ky.
Homer A. Scholze, Cincinnati, Ohio.	5	0	140.00	....do.....	Kentucky River, Ky.
	7	0	150.00		
W. H. McAlpine, Frankfort, Ky.	7	0	150.00	Frankfort, Ky.	Do.
John H. Casey, Louisville, Ky.	12	0	200.00	Louisville, Ky.	Louisville and Portland Canal; falls of the Ohio River at Louisville, Ky.
Granville W. Shaw, Louisville, Ky.	12	0	200.00	.....do.....	Falls of Ohio River at Louisville, Ky.; Green, Barren, and Rough rivers, Ky.; Wabash River, Ill. and Ind.
Samuel F. Crecelius, Louisville, Ky.	12	0	200.00	Louisville, Ky., and in the field	Survey of Ohio River.
Frank I. Louckes, Louisville, Ky.	12	0	125.00	.....do.....	Survey of Ohio River; falls of the Ohio River at Louisville, Ky.
J. H. Darling, Duluth, Minn.	12	0	300.00	Duluth, Minn.	Rivers and harbors in the Duluth district.

a With subsistence since June 12, 1907, limited to $15 per month.

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Statement showing name and place of residence of each civilian engineer employed between July 1, 1906, and June 30, 1907, etc.—Continued.

Name and place of residence.	Time employed. Mo.	Da.	Compensation (per month).	Where employed.	Works on which employed.
Clarence Coleman, Duluth, Minn	12	0	$250.00	Duluth, Minn., and Superior, Wis.	Harbor at Duluth, Minn., and Superior, Wis.
J. A. B. Tompkins, Wauwatosa, Wis	2	0	250.00	Milwaukee, Wis	Harbors on western shore of Lake Michigan.
	10	0	225.00	do	Do.
Charles Crosman, Milwaukee, Wis	10	0	100.00	do	Fox River, Wis.
L. M. Mann, Oshkosh, Wis	12	0	200.00	Oshkosh, Wis	Harbors on western shore of Lake Michigan; survey of Lake Winnebago, Wis.
Walter K. Means, Milwaukee, Wis	1	15	100.00	Milwaukee and Algoma, Wis	
	10	15	150.00		
G. A. M. Liljencrantz, Chicago, Ill	12	0	225.00	Chicago, Ill	Chicago and Calumet harbors and rivers, Ill.
C. A. Clement, Chicago, Ill	12	0	125.00	do	Do.
A. T. Grohmann, Chicago, Ill	1	10	135.00	do	Do.
	10	20	150.00		
Chr. Holth, Chicago, Ill	6	17	100.00	do	Do.
	3	0	150.00		
L. L. Wheeler, Sterling, Ill	12	0	250.00	Rock Falls, Ill	Illinois and Mississippi Canal, Ill.
James C. Long, Wyanet, Ill	12	0	233.33	Wyanet, Ill	Do.
Fred W. Honens, Sterling, Ill	12	0	150.00	One line of canal	Do.
A. O. Rowse, Sterling, Ill	12	0	150.00	do	Do.
H. E. Reeves, Sterling, Ill	12	0	150.00	do	Do.
G. C. Haydon, Tiskilwa, Ill	12	0	150.00	do	Do
J. H. Best, Sterling, Ill	7	10	150.00	do	Do.
C. M. Waters, Wyanet, Ill	5	0	125.00	do	Do.
	4	0	150.00		
C. V. Brainard, Beardstown, Ill	12	0	175.00	Beardstown, Ill	Illinois River, Ill.
James R. Fuller, Beardstown, Ill	11	0	125.00	do	Do.
	1	0	150.00		
F. W. Lehnartz, Grand Rapids, Mich	12	0	200.00	Grand Rapids, Mich	Rivers and harbors on east shore of Lake Michigan.
L. W. Goddard, Grand Rapids, Mich	12	0	a 150.00	Grand Haven, Mich., and in the field.	Harbor at Grand Haven, and Grand River, Mich.
E. S. Wheeler, Detroit, Mich	12	0	300.00	Detroit, Mich	General assistant on all work in the Detroit district.
Joseph Ripley, Sault Ste. Marie, Mich	1	0	300.00	Sault Ste. Marie, Mich	St. Marys River, including St. Marys Falls Canal, Mich.
L. C. Sabin, Sault Ste. Marie, Mich	10	15	300.00	do	Do.
Chas. Y. Dixon, Amherstburg, Ont	9	5	200.00	Amherstburg, Ont	Detroit River, Mich.
	2	25	250.00		
Harry Hodgman, Amherstburg, Ont	9	5	150.00	do	Do.
	2	25	166.67		
B. A. Tripp, Amherstburg, Ont	9	0	100.00	do	Do.
Allen E. Wright, Amherstburg, Ont	2	20	90.00	do	Do.
	2	25	100.00		
E. J. Duffies, Harbor Beach, Mich	1	13	165.00	Harbor Beach, Mich	Harbor of refuge at Harbor Beach, Mich.
	10	17	175.00		
L. P. Morrison, Sault Ste. Marie, Mich	9	0	150.00	Sault Ste. Marie, Mich	St. Marys River, Mich.
	3	0	166.67		
W. J. Graves, Sault Ste. Marie, Mich	5	18	150.00	do	Do.

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Isaac De Young, Sault Ste. Marie, Mich.	9	0	130.00	....do	Do.
	3	0	150.00		
Ross L. Mahon, Sault Ste. Marie, Mich.	9	0	116.67	....do	Do.
	3	0	135.00		
Sutton Van Pelt, Sault Ste. Marie, Mich.	9	0	116.67	....do	Do.
	3	0	125.00		
C. A. D. Young, Sault Ste. Marie, Mich.	9	0	100.00	....do	Do.
	3	0	115.00		
H. C. McNaughton, Sault Ste. Marie, Mich.	12	0	110.00	.....do	Do.
Bamlet Kent, Detroit, Mich	12	0	125.00	Detroit, Mich	St. Clair Flats Canal, Mich.
G. T. Nelles, Cleveland, Ohio	12	0	250.00	Cleveland, Ohio	All rivers and harbors in the Cleveland district.
Howard E. Smith, Ashtabula, Ohio	3	0	150.00	Ashtabula, Ohio	Harbors at Ashtabula and Conneaut, Ohio.
J. C. Quintus, Buffalo, N. Y.	12	0	233.33	Buffalo, N. Y.	Rivers and harbors on Lake Erie; Niagara River, N. Y.
John C. Churchill, Oswego, N. Y.	12	0	208.33	Oswego, N. Y.	Rivers and harbors on Lake Ontario; St. Lawrence River, N. Y.
Emile Low, Buffalo, N. Y.	3	0	175.00	Buffalo, N. Y.	Harbors at Buffalo and Tonawanda; Niagara River, N. Y.
Lynn L. Davis, Buffalo, N. Y.	12	0	150.00	.....do	Harbor at Buffalo; Lake Erie entrance to Black Rock Harbor and Erie Basin; Black Rock Harbor, N. Y.
Walter E. Stockwell, Oswego, N. Y.	4	28	85.00	Cape Vincent and Ogdensburg, N. Y.	Harbors at Cape Vincent and Ogdensburg, N. Y.
D. E. Hughes, San Pedro and San Diego, Cal.	4	26	200.00	San Pedro and San Diego, Cal.	Harbors at San Pedro and San Diego, Cal.
	5	0	215.00		
R. A. Crawford, San Pedro, Cal.	12	0	200.00	San Pedro, Cal.	Harbor at Wilmington, Cal.
H. L. Demeritt, Berkeley, Cal.	12	0	250.00	San Francisco, Cal., and in the field	Sacramento, Feather, San Joaquin, and Napa rivers; San Pablo Bay; Petaluma Creek, Cal.
L. J. Le Conte, Berkeley, Cal.	12	0	200.00	Oakland, Cal.	Harbor at Oakland, Cal.
H. H. Wadsworth, Oakland, Cal.	8	0	200.00	San Francisco, Cal., and in the field	Sacramento and Feather rivers, Cal.
	4	0	225.00		
Gerald Bagnall, Portland, Oreg.	12	0	250.00	Portland and Fort Stevens, Oreg.	Columbia River below Tongue Point, including the mouth, Oreg. and Wash.; Clatskanie River; Columbia and lower Willamette rivers below Portland, Oreg.
David B. Ogden, Portland, Oreg.	12	0	190.00	Portland, Oreg., and in the field	Columbia River at the Cascades, Willamette, and Yamhill rivers, Oreg.; Upper Columbia and Snake rivers, Oreg. and Wash.; Lewis and Cowlitz rivers, Wash.; operating and care of canals, etc.
Frederick C. Schubert, Portland, Oreg.	5	0	165.00	Fort Stevens and Cellio, Oreg.	Columbia River at Threemile Rapids and at the mouth, Oreg. and Wash.
	7	0	175.00		
James S. Polhemus, Portland, Oreg.	12	0	190.00	Portland, Oreg., and in the field	Coquille and Coos rivers; entrance to Coos Bay and Harbor; Tillamook Bay and bar, Oreg.; Columbia River at Threemile Rapids, Oreg. and Wash.; Columbia River, Wash.
J. M. Clapp, Seattle, Wash.	12	0	200.00	Seattle, Wash., and in the field	Grays Harbor and Chehalis River, waterway connecting Puget Sound with Lakes Union and Washington, Wash.; harbor at Everett, Wash.; examinations, surveys, etc.
Eugene Ricksecker, Tacoma, Wash.	7	11	200.00	Tacoma, Wash.	Harbor at Tacoma, Wash.
S. M. Kearns, Honolulu, Hawaii	3	0	150.00	Honolulu and Hilo, Hawaii	Harbors at Honolulu and Hilo, Hawaii.
Thomas Middleton, St. Louis, Mo	6	0	225.00	St. Louis, Mo.	Designing and construction of plant.
	6	0	250.00		
Kivas Tully, St. Louis, Mo.	12	0	200.00	.....do	Computing in the office of the secretary of the Mississippi River Commission.
Charles W. Clark, St. Louis, Mo	12	0	200.00	.....do	Mapping in office of the secretary of the Mississippi River Commission.
Foster H. Hilliard, Memphis, Tenn	12	0	[a] 200.00	In the field	In charge of dredging operations in Mississippi River.
Andrew T. Morrow, St. Louis, Mo	12	0	[b] 175.00	St. Louis, Mo., and in the field	Surveys on Mississippi River.
George H. French, St. Louis, Mo.	12	0	[b] 150.00	.....do	Do.

[a] With $25 additional for subsistence while in the field.

[b] With subsistence while on duty in the field.

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Statement showing name and place of residence of each civilian engineer employed between July 1, 1906, and June 30, 1907, etc.—Continued.

Name and place of residence.	Time employed.		Compensation (per month).	Where employed.	Works on which employed.
	Mo.	*Da.*			
Edward J. Thomas, St. Louis, Mo.	7	21	$140.00	St. Louis, Mo., and in the field	Surveys on Mississippi River.
	4	9	[a] 150.00		
Eugene L. Harman, St. Louis, Mo.	6	0	[a] 150.00	....do	Surveys and gauge inspections on Mississippi River.
	6	0	[a] 165.00		
George H. Wolbrecht, St. Louis, Mo.	8	12	135.00	....do	Do.
	3	18	[a] 150.00		
Truman M. Post, St. Louis, Mo.	1	4	149.99	In the field	Inspection of construction.
Frank H. Davis, Lowell, Ark.	1	1	[a] 90.00	....do	Dredging operations on Mississippi River.
A. J. Nolty, Memphis, Tenn.	11	29	200.00	Memphis, Tenn., and in the field	Care and repair of plant; construction and repair of revetment at various points on Mississippi River.
M. Gardner, Memphis, Tenn.	12	0	200.00	....do	Construction and repair of revetment; in charge of levee work in first and second districts, Mississippi River
Arthur Hider, Greenville, Miss.	5	0	250.00	Greenville, Miss., and in the field	Mississippi River, third district.
	7	0	275.00		
Edward C. Tollinger, Vicksburg, Miss.	12	0	200.00	Vicksburg, Miss., and in the field	Do.
Alexander M. Todd, Vicksburg, Miss.	12	0	200.00	....do	Do.
H. S. Douglas, New Orleans, La.	7	25	225.00	New Orleans, La.	Mississippi River.
	3	5	275.00		
E. B. Geddes, Natchez, Miss.	8	0	[b] 175.00	New Orleans, La., and in the field	Do.
	4	0	190.00		
W. E. Knobloch, New Orleans, La.	2	15	225.00	New Orleans, La.	Do.
A. Stierle, San Juan, P. R.	2	0	150.00	San Juan, P. R.	Harbor at San Juan, P. R.

[a] With subsistence while on duty in the field.

[b] With subsistence while in the field.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 478.

BAYOU COURTABLEAU, LOUISIANA.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF BAYOU COURTABLEAU, LOUISIANA.

JANUARY 11, 1908.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, January 10, 1908.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated January 6, 1908, together with copy of a report from Col. E. H. Ruffner, Corps of Engineers, dated July 13, 1907, of a preliminary examination of Bayou Courtableau, Louisiana, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, January 6, 1908.

SIR: I have the honor to submit herewith for transmission
gress report of July 13, 1907, by Col. E. H. Ruffner, Corps
neers, on preliminary examination authorized by the river
act approved March 2, 1907, of Bayou Courtableau, Lou
a view to obtaining 12 feet of water.

Between 1880 and 1901 appropriations aggregating $
expended in the removal of snags, drift, and other obst
the natural channel.

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From the facts and for the reasons given I concur in the opinion of the district officer and the Board of Engineers for Rivers and Harbors that the work of improving Bayou Courtableau so as to secure a depth of 12 feet is not worthy of being undertaken by the General Government.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF BAYOU COURTABLEAU, LOUISIANA.

WAR DEPARTMENT,
ENGINEER OFFICE, UNITED STATES ARMY,
New Orleans, La., July 13, 1907.

GENERAL: I have the honor to submit the following report of a preliminary examination of "Bayou Courtableau, Louisiana, with a view to obtaining twelve feet of water," assigned to me by Department letter of March 14, 1907.

This bayou is formed by the junction of Bayous Cocodrie and Boeuf 5 miles above Washington, La. From the source it flows in a comparatively straight course past Washington and Port Barre on to the Atchafalaya River, having a total length of between 32 and 33 miles. There is deep water through nearly its whole length, and the difficulties now in the way of its being utilized up as far as Washington are the formation near its mouth of what is known as Little Devil bar and the accumulation of drift upon it from the Atchafalaya River. The need is of an improvement that will change conditions at its mouth so that the bar will not re-form and that will exclude the drift from the Atchalafaya after once removed. It would be necessary also to dredge the bayou from a short distance below Bayou Carron to Washington, a distance of perhaps 1.5 miles.

Bayou Courtableau has been the object of improvement since the first appropriation, June 14, 1880, of $7,500. The last act, March 3, 1899, gave $20,000; the total of nine different appropriations was $58,700.

The last report made from this office on this improvement is found in the Report of the Chief of Engineers for 1901, Part 3, page 1898. It was there stated that all snags, logs, and drift were removed between March 25 and April 22, 1901. Since then no work has been done on the bayou.

It is to be noted that the terms of this preliminary examination involve a question of securing a depth of 12 feet, while the former appropriations and the former projects were confined to the general idea of removing the snags and logs and drift. A survey was made of the bayou in 1880 and is reported in the report for 1881, page 1293. That survey and the blueprint[a] inclosed, prepared by the Union Rice Irrigating Company, will show the condition of the bottom of the bayou.

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[a] Not printed.

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An examination was made by Assistant Engineer J. I. Conklin in April, 1907, and his report is inclosed. From this it is clear that there is and will be a reasonable amount of business on this bayou, and that this business is steadily interfered with by the constant re-formation of the raft near the mouth and above it, and that the constant removal of this raft alone will secure a navigable waterway; but there is absolutely no evidence presented to him or to me looking forward to the necessity of a depth of 12 feet in the bayou; and, inasmuch as the profile [a] submitted indicates that very extensive dredging would be necessary to secure this depth, I am of the opinion that the improvement of Bayou Courtableau to secure a depth of 12 feet is not worthy of being undertaken by the General Government.

Respectfully submitted.

E. H. RUFFNER,
Colonel, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.

[Second indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., August 26, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

About $55,800 have been expended in the improvement of this bayou, the principal work done having been the removal of obstructions and the closing of outlet bayous. The last work done was in 1901. The principal obstruction to navigation is a bar near the mouth of the bayou formed mainly by back water from the Atchafalaya River. On this bar logs accumulate and have at times completely closed the river to navigation.

At one time there was considerable commerce on this stream, and it appears from the reports within that this would be revived if navigation were made possible, as the country adjacent is prosperous and rail transportation often in a congested condition. The district officer states:

> It is clear that there is and will be a reasonable amount of business on this bayou, and that this business is steadily interfered with by the constant re-formation of the raft near the mouth and above it, and that the constant removal of this raft alone will secure a navigable waterway; but there is absolutely no evidence presented * * * looking forward to the necessity of a depth of 12 feet in the bayou; and, inasmuch as the profile submitted indicates that very extensive dredging would be necessary to secure this depth, I am of the opinion that the improvement of Bayou Courtableau to secure a depth of 12 feet is not worthy of being undertaken by the General Government.

The Board agrees with the district officer that the necessity for a depth of 12 feet is not apparent. Bayou Plaquemine, the natural outlet for this section of country, having now a commerce reported at 700,000 tons, which may reasonably be expected to increase considerably in the future, is being improved to a depth of 10 feet. Bayou Teche, which carries a commerce of about 400,000 tons, has an improved low-water depth of about 4 to 5 feet. Bayou Vermilion, with a commerce of about 25,000 tons, has a depth of about 5½ feet. The inland waterway through southern Louisiana recently under-

[a] Not printed.

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taken by Congress has a projected depth of 5 feet. All these waters connect, and it seems reasonable to suppose that the same general character of steamboats would use Bayou Courtableau as ply on other streams in Louisiana, and these do not have a draft of anything like 12 feet. While holding this view, the Board, however, believes that the commerce existing and prospective on the bayou is entitled to some relief from present conditions, which relief can be obtained by clearing away the raft and bar which now obstruct the mouth of the bayou. Work of this character, however, does not require a new survey or estimate of cost, since it forms part of the project which already exists for the improvement of this waterway, and can therefore be effected through appropriations for maintenance of such project.

In view of the foregoing the Board expresses the opinion, concurring with the district officer, that the improvement of Bayou Courtableau to a depth of 12 feet is not advisable.

In its review of this subject the Board has given consideration to the views of the Progressive League of Washington, La., as expressed in a letter to the assistant engineer and incorporated in his report, which is made a part of that of the district officer.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

REPORT OF J. I. CONKLIN, ASSISTANT ENGINEER.

UNITED STATES ENGINEER OFFICE,
Plaquemine, La., May 7, 1907.

SIR: I have the honor to submit the following report of preliminary examination of Bayou Courtableau:

This bayou is formed by the junction of Bayous Cocodrie and Boeuf, 5 miles above Washington. From the source it flows in a comparatively straight course past Washington and Port Barre on to the Atchafalaya River, having a total length of between 32 and 33 miles.

There is deep water through nearly its whole length, and the difficulties now in the way of its being utilized up as far as Washington are the formation near its mouth of what is known as Little Devil bar and the accumulation of drift upon it from the Atchafalaya River.

The need is of an improvement that will change conditions at its mouth so that the bar will not re-form, and that will exclude the drift from the Atchafalaya after once removed. It would be necessary also to dredge the bayou from a short distance below Bayou Carron to Washington, a distance of perhaps 1½ miles.

The inclosed blueprint, prepared by the Union Rice Irrigating Company, will show the conditions of the bottom of bayou. The two water lines shown are determined by measurements from the rail in center of bridge on April 15, 1907, and the low-water line being an approximate one on estimates given by residents as to the amount of fall to low water, as there is no gauge in the bayou.

This bayou twenty years ago was a very important one, and Washington was the shipping point for the product of a very large surrounding country. Three lines of boats touched at this point. At that time the question of drift forming at the mouth was not heard of, but the gradual enlargement of the bed of the Atchafalaya has changed the currents at the immediate mouth of Courtableau so that the drift now has a tendency to turn in at the opening. Old residents informed me that the condition was once exactly the opposite, and it was with difficulty that timber coming down the Atchafalaya could be turned in. In other words, the condition which now exists is an accident in the enlargement of the Atchafalaya at the mouth of Courtableau.

An examination of the mouth at the present time shows this condition plainly, as a strong eddy is present on the Courtableau side. In the preparation of the statistics of

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the bayou, I received important and efficient aid from the Progressive League of Washington, and during my stay in Washington of two days I had a chance to observe the painstaking care with which the information herewith was obtained, also the reliability of its source.

A copy of the letter containing this information I herewith include as a part of this report:

"WASHINGTON, LA., *April 20, 1907.*

"DEAR SIR: We, the undersigned committee, herewith submit the following report in regard to data on the commerce of Washington, La., and contiguous territory, present and prospective, including incoming and outgoing freight, as shown by the following figures:

Articles.	Tons.	Value.	Railroad freight charges.	Water rate on same.	Net saving.
Cotton-oil mill products	6,000	$150,000	$24,000	$19,200	$4,800
Hard wood (lumber)	20,000	200,000	48,000	38,400	9,600
Cypress (lumber)	5,000	45,000	18,000	14,400	3,600
Baled cotton	3,750	750,000	26,020	15,000	11,020
Brick	3,500	13,600	2,420	1,935	484
Groceries and sundries	9,000	1,800,000	72,000	57,600	14,400
Grain and flour	10,000	350,000	70,000	56,000	14,000
Wagons and buggies	80	16,000	2,000	1,000	1,000
Machinery	105	25,000	5,000	4,000	1,000
Coal and fuel oil	1,500	6,750	2,250	1,800	450
Bagging and ties	200	20,000	1,000	800	200
Dry goods, notions, shoes, clothing, hats	600	300,000	5,000	4,000	1,000
Sirup	5,000	30,000	5,000	4,000	1,000
Hides	180	36,000	1,080	864	216
Moss	120	5,000	720	576	144
Poultry and eggs	90	10,800	360	288	72
Horses and mules	30	12,000	300	240	60
Cord wood	630	2,500	1,000	800	200
Furniture	30	3,000	450	360	90
Fish	15	2,100	90	72	18
Total	65,830	3,777,750	284,690	221,336	63,354
Add to for Port Barre, etc	21,940	1,259,250	95,330	74,125	21,204
Grand total	87,770	5,037,000	380,020	295,461	84,558

"One important feature we wish to call to your attention is the fearful congestion of freights at our railroad depot, which has occurred for the past several years from the 1st of October to February, causing great loss to our community. Many thousands of dollars are tied up here annually for the want of adequate transportation facilities, which, it seems to us, naturally calls for some relief. We give you a few instances of the troubles and difficulties we are laboring under. In this regard, we cite an instance where 100 tons of cotton seed were purchased last season, and before the party could be furnished transportation facilities asked for the seed rotted. A car of salt ordered in January of this year for immediate shipment reached here the 12th of this month.

"Often cotton billed to New Orleans remains in transit a month. This, with the erratic fluctuations of the price of cotton, often incurs serious loss to the owner or shipper, whereas with Bayou Courtableau navigable, same could be landed in New Orleans by boat within forty-eight hours.

"Will further add that owing to the continued congestion of freights during the fall months and the large amount of capital being tied up thereby, often the cotton operators are either forced to suspend operations entirely or are compelled to work on wider margins than under ordinary circumstances in order to offset the heavy interest, insurance, and possible damage to cotton tied up, thus affording a lesser price to the producer. Bear in mind that this refers to the one item only, cotton, those interested in other products suffering proportionately.

"We wish to add that the service furnished us by the railroad company at the present time is poor at its best. During the fall months goods are in transit from New Orleans here, a distance of 173 miles, for a period of a week to ten days, and often for a longer period. It is a common occurrence for goods to be in transit from New York, St. Louis, Cincinnati, and other equally distant points for a period of a month or more. Too much can not be said relative to freight rates, which are exorbitant. We know that freights, where there is a railroad and water competition, are carried a thousand miles or more at the same rate as like freights are carried in our territory a

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distance of 40 to 75 miles, whereas if Bayou Courtableau was restored to navigation such conditions would hardly exist.

"We think it in order to call your attention to the fact that our troubles relative to Bayou Courtableau have largely arisen since the advent of the railroads. Previous to that time Washington was the shipping point for the territory within a radius of 60 miles or more, with practically no, or very little, interruption to commerce.

"In regard to prospective data our territory is rapidly being opened up by the clearing of new lands for cultivation, by the incoming of new people in addition to the natural increase of population, and by the starting of new industries.

"In the last few years there has been cleared and put in cultivation an area of 7 miles on both sides of Bayou Courtableau, below Port Barre, and several new sawmills have recently been established along this route. In addition to the above there is being erected at Washington a hardwood sawmill with capacity of 40,000 feet daily, and several other enterprises are contemplated, all of which would be greatly benefited by the restoration of Bayou Courtableau to navigation.

"We wish to say further that innumerable instances, testifying to the necessity of increased transportation facilities, could be cited, and those which have been cited can be substantiated by documentary evidence.

"We believe that the existing conditions demand immediate relief, which we hope may be granted this suffering community.

"Respectfully submitted.

"LEON WOLFF,
"AUG. J. MILLER,
"JONAS W. BAILEY,
"JAS. J. CARRIERE,
"*Committee, Washington Progressive League.*

"Mr. J. I. CONKLIN,
"*United States Engineer, Plaquemine, La.*"

The conditions here shown to exist would seem to fully warrant the recommendation that the stream is worthy of improvement, as the $84,558 annual net saving represents only a part of the benefits to be derived, as the question there seems to be as much one of inadequate service as it does of exorbitant freight rates.

The engineering features and difficulties which are to be dwelt upon only in a general way are—

First. The removal of the drift, which is now formed so that it is approximately 1 mile in extent, and the prevention of future jams from forming.

Second. The handling of the currents in the first 6 miles of the bayou from its mouth in such a manner as to eliminate Little Devil bar, and this feature is the most difficult one to overcome.

Third. The dredging of the upper end of the bayou to provide a depth of 12 feet over the bars. Of these three conditions the second one is by far regarded as the most serious one and one that would have to be worked out by the harmonious action of whoever was handling the bayou improvement and the authorities handling the extension of the levee systems down the Atchafalaya River.

It is to be borne in mind that on the downstream side of Courtableau, all within 6 or 7 miles from its mouth, are numerous outlets, the most important of which are Big and Little Cane, Big and Little Fordice, and Mamzelle. All these bayous are open (the former dikes having gone out) and are taking large quantities of water.

These bayous with the overflow of the banks of the Courtableau between these bayous account for the great quantities of water which must enter the mouth of Courtableau. There is also some water that overflows the Atchafalaya above Bayou Courtableau, and below the present end of the levee system, that enters and flows across Courtableau. It is readily seen that the currents entering Courtableau from Atchafalaya will be increased as the levee is brought down to the mouth and extended below it, unless the levee should be carried a certain distance up Courtableau across all the small outlets. This, I regard, would solve nearly all the present difficulties, for it would then be simply a storage basin for a certain amount of the Atchafalaya water during a period of rise. The current up Courtableau being limited by the capacity of the bayou, would largely eliminate drift and sediments. During a period of fall the downward current would continue from first to last beyond the bar, washing out any deposit. It may be remarked here that a large canal that is said to drain a large territory is soon to enter Courtableau in the neighborhood of Bayou D'Arbonne. This would also be a new factor in creating a downward current, as large quantities of water would reach Courtableau that before have gone through other channels. The conclusion reached by this preliminary examination is that Bayou Courtableau is worthy of improvement and that the necessities of the country tributary to it are sufficient to

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warrant it. They are losing practically $90,000 per annum from the conditions which close this natural avenue to commerce. If the levee coming down Atchafalaya could continue up Courtableau to the high land, I would recommend the improvement, looking toward 12 feet, for I believe then they would be permanent. I would recommend a survey to determine accurately quantities and conditions and to prepare a project for 12 feet depth from Washington to Atchafalaya River. This survey would cost approximately $2,500.

Attention is here called to the fact that the Colorado Southern Railroad has constructed a bridge across Bayou Courtableau, about 12 miles from its mouth, without a draw span.

Very respectfully, your obedient servant,

J. I. CONKLIN,
Assistant Engineer.

Col. E. H. RUFFNER,
Corps of Engineers, U. S. A.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 479.

MUNISING HARBOR, MICHIGAN.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF MUNISING HARBOR, MICHIGAN.

JANUARY 11, 1908.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, January 10, 1908.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated January 4, 1908, together with copy of a report from Maj. Graham D. Fitch, Corps of Engineers, dated September 21, 1907, of a preliminary examination of Munising Harbor, Michigan, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, January 4, 1908.

SIR: I have the honor to submit herewith for transmission to Congress report of September 21, 1907, by Maj. Graham D. Fitch, Corps of Engineers, on preliminary examination of Munising Harbor, Michigan, authorized by the river and harbor act of March 2, 1907.

From the facts and for the reasons given I concur in the opinion of the district officer, the division engineer, and the Board of Engineers for Rivers and Harbors that this locality is not worthy of improvement by the General Government.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

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PRELIMINARY EXAMINATION OF MUNISING HARBOR, MICHIGAN.

UNITED STATES ENGINEER OFFICE,
Duluth, Minn., September 21, 1907.

GENERAL: In compliance with Department letter of March 14, 1907, I have the honor to submit the following report upon a preliminary examination of Munising Harbor, Michigan.

This locality was visited by me on July 14, 1907, for the purpose of making said examination. I there met several of the representative citizens and learned from them verbally what was desired in the way of improvements to their harbor. I have also received a number of written communications[a] from interested parties bearing on this subject, and these form inclosures accompanying this report, to which attention is respectfully invited.

Descriptive.—Munising is a village of 3,000 inhabitants, on the south shore of Lake Superior, about 40 miles east of Marquette, and about the same distance west of the harbor of Grand Marais, Michigan. It is situated on the fine natural deep-water harbor of South Bay and protected from direct exposure to Lake Superior by Grand Island, which lies just outside the bay, with two entrances between the island and the mainland. The bay is 3½ miles long in a northeast and southwest direction and 3 miles wide in its greatest dimensions. The village of Munising is located on the southerly extremity or arm of South Bay.

The physical features of Munising and its surroundings are best shown by the United States Lake Survey chart of Grand Island and its approaches (catalogue Sc 1). A map showing the immediate vicinity of Munising Harbor on a larger scale, with its wharves and industries, is found in the recently published Lake Survey chart, catalogue Sc 2, 1907. The Lake Survey general chart of Lake Superior, catalogue S, may be consulted for showing the relation of this harbor to the entire lake.

For many years there has been a settlement called Munising, on the east side of the bay, but only in recent times has the present village sprung into existence. The village was incorporated in 1896. It owes its development to the Cleveland Cliffs Iron Company, which owns the site and has secured the establishment of a number of important industries. The chief business of the town is manufacturing. Among the articles of manufacture are lumber, paper pulp, paper, hardwood veneers, and leather. The raw material for the timber products is from the extensive growth of forests in the surrounding country. The paper mill of the Munising Paper Company (Limited) is said to be the largest in Michigan and the most modern in the United States. Its daily capacity is 60 tons, it employs 200 men night and day, and 200 men in the woods during the logging season, and is stated to use 20,000,000 feet of hemlock logs yearly.

Commerce.—The amounts of freight, arrival and departures of vessels, and registered tonnage were furnished this office by Special Deputy Collector of Customs W. W. Osband, Marquette, Mich. The valuations of freight were computed at this office.

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[a] Not printed.

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Commercial statistics, Munising, Mich., for calendar year 1906.

ARRIVALS AND ENTRANCES OF VESSELS.

	Arrived.	Cleared.	Total.	Net registered tonnage.
Steam	19	17	36	21,965
Tow	4	4	8	3,886
Total	23	21	44	25,851

PRINCIPAL ARTICLES RECEIVED AND SHIPPED.

	Tons.	Valuation.
Received:		
Coal	2,945	$14,578
Cement (500 barrels)	100	1,000
General merchandise	144	25,200
Total	3,189	40,778
Shipped:		
Lumber (8,650,000 feet B. M.)	12,975	167,378
Cedar ties (14,900)	828	7,748
Total	13,803	175,126

Total freight received and shipped	tons.. 16,992
Total valuation of receipts and shipments	$215,904

As to prospective commerce, I see no basis for predicting any great increase. While possessing a fine natural harbor, the geographical position of Munising is not such as to make it a transfer point for freight moving east or west, nor is it a shipping point for large bodies of iron ore, as at Marquette, Ashland, Duluth, and Two Harbors, on this lake. The timber products manufactured and shipped may increase for a time, but eventually must diminish with the exhaustion of the standing timber.

Improvements desired.—As set forth in the several communications which accompany this report, the people of Munising desire to have built by the Government an artificial protection to the harbor from waves which enter the bay from northeast storms, such protection to be a breakwater at the east entrance, to extend out from Sand Point in a direction about north 26° west, across a sand bar having from 4 to 9 feet of water over it, for a distance of 1,800 feet. They also wish additional range lights and other marks, for aids to navigation in entering the harbor.

The marking of the channels is a duty pertaining to another department of the United States, the Light-House Establishment, to which this matter will undoubtedly be referred, and therefore will not be considered in this report.

Wave action.—It is claimed that waves come in through the east passage during northeast storms with such force as to cause much damage to logs stored in booms, to wharves, boathouses, and other property along the harbor front, and to interfere with vessels lying at the wharves.

One firm reports an annual loss of $1,000 to $2,000 in logs and another a loss of $4,000 or $5,000 in logs during two particularly [redacted] years.

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As a remedy for this they have proposed a breakwater to be built at the east entrance to the harbor, as already stated. A little investigation, however, makes it evident that the greater portion of the waves are generated within the bay by the action of wind upon the 3½-mile stretch of deep water between the east entrance and the harbor front at the village. The height of waves which would be developed in this reach during a violent northeast gale is 3.8 feet, as computed from the well-known formula:—

$$H = 1.5\sqrt{D} + (2.5 - \sqrt[4]{D}),$$

as given by Stevenson in his Construction of Harbors, page 29, in which H is the height of wave in feet, from trough to crest, and D is the reach of water, or fetch, in nautical miles. This formula has been verified by comparison with observation in numerous instances and found to be generally correct, or nearly so.

There is as great a reach of water in the bay from the north of the village, but the high land of Grand Island breaks the wind from that direction.

As for the waves coming through the entrance, the stretch of deep water to the northeast, between Grand Island and the Canadian shore of Lake Superior, is about 107 statute miles, and this, in a heavy northeast gale, would produce waves of 14.4 feet, as computed by another Stevenson formula which is used for long reaches, $h = 1.5\sqrt{d}$, in which h is the height of the wave in feet and d the fetch in nautical miles. On account of the convergence of the shores outside the entrance, abreast of Trout Point, and the gradual lessening of the depth of water in the approach, it is likely that the waves would reach some greater height than that computed, perhaps 16 feet or even more.

The entrance is 3,300 feet wide from shore to shore at the narrowest place. Through this entrance is a deep channel, 1,400 feet wide with a depth of 36 to 100 feet, and on either side of this channel is shallower water. On the southeast side this shallow water is in the form of a sand bar, 1,400 feet wide, which is the site of the proposed breakwater, and on the west side is a strip of moderately shoal water 500 feet wide.

The deep channel will allow waves of full height to enter the bay. After entering, these waves will spread out and decrease in height. The amount of this decrease in height may be roughly computed by means of a formula for the reduction of waves in a harbor, given by Stevenson in his book above cited, page 165, and in many other treatises. From this formula it appears that if we consider the deep channel by itself, and suppose the remainder of the entrance closed, and also leave out of account the action of the wind inside the harbor, these waves would be reduced to about one-tenth of their height by the time they reached the Munising wharves. So that if their height coming through the entrance channel were 16 feet they would be reduced to about 1.6 feet. This is less than the wave height produced by the wind within the harbor, but adds to the disturbance at the wharves. This component of the waves would not be remedied by the proposed breakwater nor would be the greater component due to the waves produced by the wind within the harbor.

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We may consider the effect of a breakwater as proposed in the following way: A sand bar with shallow water extends out into the entrance from the southeast side for a distance of 1,400 feet from Sand Point, reckoned in a direction at right angles to the axis of the entrance. The extent of this bar is about one-half mile in the direction of the axis of the entrance, and the average depth over this area is about 6½ feet at low water, this being the depth reduced from soundings shown on the Lake Survey chart made in 1859. This was forty-eight years ago and the form of the bar may have changed since then, but these are the latest soundings available, excepting a line of soundings run out from the extremity of Sand Point by a party in Munising in July, 1905. The latter shows depths varying from 4 to 9 feet over the bar, being a mean of 5.1, and this would reduce to 3.8 at low water and would possibly be 5½ feet during a severe northeast gale in the fall.

Storm waves passing over this bar must break and lose much of their energy, as waves break in water having a depth equal to the height of the wave, and often break in deeper water than that. How much these waves would be reduced in passing over this bar I am not able to estimate. This would more properly be a matter for observation, but no observations have been taken to determine it. A 16-foot wave in the lake after breaking over this bar would terminate in a smaller wave of normal form in the deeper water just inside the bar, and this, I should guess, would not be more than 8 feet in height, and more probably would be 6 or 5 feet.

Now if we suppose for a moment the remainder of the entrance closed and the sea passing over this bar alone of a width of 1,400 feet, and also leave out of account wind action inside the harbor tending to generate waves, these residual waves, of say 5 or 8 feet in height, started into the bay, would be further reduced by spreading laterally inside the bay to about one-tenth of these heights (theoretically) by the time they reached the farther portion of the harbor at the Munising wharves. This reduced height would be 0.5 or 0.8 feet. It can not be observed or measured directly, as these waves which pass over the sand bar combine with those which come through the deep channel, and are further much increased in size by the wind acting on the water inside the bay, but this estimate will give some idea of the component part which the waves passing over the sand bar form in making up the actual waves which do the damage to the harbor front. This is the component which would be destroyed by the proposed breakwater, and it is so small that the relief which would be afforded by such a breakwater would probably be inconsiderable, and a disappointment to the citizens if it were to be built.

A rough preliminary estimate of the cost of a breakwater at this place indicates that the annual charge against it for interest and maintenance would exceed the average annual damages caused by the waves at the harbor front.

Some greater protection from waves coming through the entrance would be had by closing up more of the entrance by means of another breakwater built out from the northwest side, at a point on the shore of Grand Island opposite the proposed breakwater on the east side, and extending for a distance into the deep channel so as to leave an opening for vessels no wider than necessary for their safety in enter-

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ing, which might be 1,000 feet or less. This would require 900 feet or more of length in the west breakwater, a considerable portion of which would be in rather deep water, which would, of course, be very expensive.

Even though one or two breakwaters were built at the entrance, there would still remain the chief cause of damage to the harbor front, namely, the formation of waves within the bay, as already described, and to protect the harbor from this disturbance would require a breakwater to be built nearer to the wharves, say at a distance of a mile or a mile and one-half from the harbor front, in one or two parts having an aggregate length of about 1 mile, and in a depth of 84 feet of water or greater. The cost of this would, of course, be prohibitive.

For this discussion on wave action I am indebted to Mr. J. H. Darling, assistant engineer.

Conclusion.—In view of what precedes, taking into account the probable cost of either one or more of the breakwaters mentioned, the probable efficiency of such, and the amount of commerce to be benefited, I deem it inadvisable for the Government to undertake the construction of a breakwater protection for the harbor of Munising.

There is no improvement which I have to recommend for this harbor aside from such additional aids to navigation as the Light-House Department may see fit to establish.

Respectfully submitted.

GRAHAM D. FITCH,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

OFFICE DIVISION ENGINEER, NORTHWEST DIVISION,
Chicago, Ill., October 9, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army.

I concur with Major Fitch in the opinion that while additional aids to navigation might, at reasonable expense, add very greatly to the utility of this harbor in bad weather, it is inadvisable at the present time for the United States Government to undertake the improvement of this harbor by the construction of breakwaters or other similar works.

W. H. BIXBY,
Lieut. Col., Corps of Engineers,
Division Engineer, Northwest Division.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., December 23, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

This harbor is well protected from heavy waves from the north and northwest by a projection of the mainland and by Grand Island, but northeast winds enter the harbor through the east entrance, which is about 3,300 feet in width. The harbor itself, shown on the charts as South Bay, is about 3½ miles in length in a northeast and

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southwest direction, having a width for the most part of about 8,000 feet, increasing to a maximum of about 3 miles in one portion of it. The harbor is therefore large enough to permit of waves of considerable size, computed by the district officer at about 3.8 feet, being generated within it. These waves are augmented by those coming in through the entrance. These latter having a fetch of about 107 miles, may, in time of very high winds, reach a theoretical height of between 14 and 15 feet. These do not enter the harbor, however, with this height, for the reason that just within the entrance there is a sand bar, with a depth on it of from 4 to 9 feet, which makes out from the main shore at Sand Point toward the island for a distance of about 1,900 feet, and which, of course, causes waves of this height to break and expend much of their energy. Just what height these waves will add to those generated within the harbor can not be closely estimated.

The improvement desired is a breakwater extending out over the sand bar for a distance of 1,800 feet, with a view to checking the force of the entering waves. As there would still be an opening between the end of the breakwater and Grand Island of about 1,500 feet of very deep water, the desired result of checking the entering waves would be only partially effected. Such a breakwater would be quite expensive, and if extended far enough to reduce the opening to such an extent as to materially reduce the size of the waves, or if in order to produce this result an additional breakwater were run out from Grand Island toward the proposed end of the 1,800-foot breakwater, thus reducing the opening, the cost would be prohibitive. The object desired is to reduce the wave action in the harbor in front of the village of Munising, where lumber interests have log booms in which large quantities of timber are stored.

The commerce as reported within to be affected by the improvement of this harbor is small, amounting to a total of 16,992 tons, valued at $215,904. It is presumed that this commerce is exclusive of floated logs, the tonnage of which is not stated. It appears from communications accompanying the report of the district officer, and others submitted to the Board by interested parties, that a loss to the timber interests of several thousand dollars during severe storms is sometimes incurred.

The district officer and the division engineer unite in the opinion that the improvement of the harbor by the construction of a breakwater as desired is not worthy of being undertaken by the United States, and the district officer states that a preliminary estimate of the cost of the breakwater indicates that the annual charge against such a structure for interest and maintenance would exceed the annual damage caused by wave action in the harbor.

While some benefit would no doubt result from the desired improvement, the extent of this benefit would not, in the opinion of the Board, be sufficient to warrant the outlay necessary for the construction of the breakwater, and it concurs in the suggestion of the district offic[illegible] that the relief which would be effected by such a breakwater w[illegible] probably be inconsiderable and disappointing to the citi[illegible] built. In view of the foregoing, the Board believes [illegible] visable for the United States to undertake the i[illegible] Munising Harbor, Michigan, at this time.

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In addition to written communications submitted by interested parties, the Board has given consideration to oral statements made in behalf of the improvement by Mr. H. H. Everard and Hon. H. Olin Young, Member of Congress, who were accorded a hearing at the Board's session of this date.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 490.

SABINE RIVER, TEXAS AND LOUISIANA.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF SABINE RIVER FROM ITS MOUTH TO LOGANS PORT, LA., AND BELZORA, TEX.

JANUARY 13, 1908—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, January 11, 1908.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated January 10, 1908, together with copy of a report from Maj. J. F. McIndoe, Corps of Engineers, dated December 11, 1907, of a preliminary examination of Sabine River from its mouth to Logansport, La., and Belzora, Tex., made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

THE SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, January 10, 1908.

SIR: I have the honor to submit herewith for transmission to Congress report of December 11, 1907, by Maj. J. F. McIndoe, Corps of Engineers, on preliminary examination authorized by the river and harbor act approved March 2, 1907, of Sabine River from its mouth to Logansport, La., and Belzora, Tex.

From the facts and for the reasons given I concur in the opinion district officer, the division engineer, and the Board of Engi- Rivers and Harbors that this locality is not worthy of nt by the General Government at the present time.

spectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

WAR.

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PRELIMINARY EXAMINATION OF SABINE RIVER FROM ITS MOUTH TO LOGANSPORT, LA., AND BELZORA, TEX.

WAR DEPARTMENT,
UNITED STATES ENGINEER OFFICE,
New Orleans, La., December 11, 1907.

GENERAL: In compliance with Department letter of March 14, 1907, I have the honor to submit the following report upon a preliminary examination of Sabine River from its mouth to Belzora, Tex., and Logansport, La., made in accordance with river and harbor act of March 2, 1907.

The examination was made by Mr. F. F. Axtell, junior engineer, by launch from mouth of river to the head of the Narrows, a distance of 38 miles, and by team from Logansport to Belgrade, a distance by river of about 200 miles. The latter was the only means of transportation available at the low stage of the river.

The following is quoted from his report:

A general description of the river, its physical condition, nature of obstructions, etc., will not be attempted in this report. These have been fully and accurately described in previous reports on this river, especially the report by Mr. A. H. Weber, assistant engineer, in 1902, and the examination made by me but confirms what has already been said with reference to the condition of this river.

At the present time the river is navigable during ordinary low stage from mouth to Morgans Bluff, a distance of 28 miles. Above Morgans Bluff the river is not navigable during ordinary low stage, being obstructed by innumerable snags, sunken logs, and overhanging trees, and by sand, gravel, conglomerate or rock shoals throughout its entire upper length. Not only is the river in bad condition above Morgans Bluff, but there seems also to be a gradual deterioration rather than any improvement, this information being obtained from persons familiar with the river. This deterioration, however, I think is due to the cutting down within the last few years of great numbers of overhanging trees along the sides and top edge of the banks of the river, by the lumber companies, to facilitate the rafting of logs down the river during high water, and will likely be but temporary, as each succeeding high water should carry out numbers of these present obstructions to low-water navigation.

In the following presentation of the commercial statistics, both present and prospective, of the Sabine River, the item of logs is omitted. They are neither barged nor towed, but floated down the river loosely during high water. The logging interests appear satisfied with the river as it is, and any work done on the river for the improvement of low-water navigation would not affect the logging interests one way or the other.

At Logansport, La., the present commerce on the river, excluding logs, practically amounts to nothing. The following is an estimate of the prospective yearly commerce to and from Logansport, based on an improved river:

Articles.	Tons.	Value.
Cotton	1,000	$200.000
Staves	8,000	100,000
Cottonseed	300	4,500
Merchandise	500	25,000
Lumber	500	4,500
Total	10,300	334,000

Whatever commerce on the river that does not go to or from Logansport would necessarily go to or from Orange, Tex., as these are the only two towns on the river. Mr. A. H. Weber, assistant engineer, in his report on preliminary examination of Sabine River, made in 1902, stated that the commerce of the upper river, from and to Orange, Tex., for the calendar year 1901, excluding logs, amounted to 874 tons, valued at $43,425. For calendar year 1906 it was as follows:

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Articles.	Tons.	Value.
Lumber	1,000	$9,000
Cattle	150	9,000
Merchandise	100	5,000
Feed stuff	20	800
Total	1,270	23,800

The increase in five years has been but little, and owing to the fact that practically all the land along the entire upper river is held by the large timber interests, and that it will be many years before it is thrown open to settlement, I do not think any large immediate increase in commerce would result from an improved river. An exception should probably be made in the item of staves, the shipment of which would be largely increased for a few years and then probably cease.

Under the provisions of the act of June 13, 1902, a preliminary examination of Sabine River was made in September, 1902, under the direction of Col. H. M. Adams, Corps of Engineers. Reference is invited to report of Colonel Adams (Annual Report, Chief of Engineers, 1904, p. 1957) for a brief summary of previous examinations and surveys of Sabine River.

From the mouth of Sabine River to Morgans Bluff, 28 miles, there is ample depth and width for all present and prospective commerce and there are but few obstructions. From Morgans Bluff to Logansport, a 3-foot depth could be secured by removing many thousands of sunken logs, snags, and overhanging trees and by dredging and blasting about 15 shoals.

In view of the small amount of commerce on the river above Morgans Bluff, of the little likelihood of any substantial increase, and of the satisfactory condition of the river below Morgans Bluff, it is my opinion that the Sabine River is not worthy of improvement by the General Government.

Very respectfully,

J. F. McINDOE,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

OFFICE DIVISION ENGINEER, GULF DIVISION,
New Orleans, La., December 12, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army, concurring in the recommendation of the district engineer as given within.

E. H. RUFFNER,
Colonel, Corps of Engineers,
Division Engineer.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., January 6, 1908.

Respectfully returned to the Chief of Engineers, U. S. Army.

The preliminary examination reported upon within has in view the improvement of Sabine River from its mouth to Logansport, La., and to Belzora, Tex., this place being situated approximately 169 miles above Logansport and about 468 miles above the mouth.

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Several examinations and surveys of this stream have previously been made, and a limited improvement was carried on from time to time between 1879 and 1900. From the information available it appears that this stream is navigable at ordinary stages for a distance of about 28 miles from its mouth, but that beyond this distance it is obstructed by snags, sunken logs, overhanging trees, sand and rock shoals, rendering steamboat navigation impracticable during low stages. The river is given up to logging, which is carried on under regulations approved by the Secretary of War in accordance with the wishes of persons interested, the importance of this industry and the value of the stream for logging purposes having been fully recognized.

While it may be practicable to obtain a channel 3 feet deep to Logansport by the removal of obstructions and by dredging and blasting the shoals, the inauguration of regular steamboat navigation upon the river would make necessary the prohibition of running loose logs, which is now the most important industry of the tributary country. The sparsely settled condition of this territory and the absence of established communities of importance between Orange and Logansport make most improbable the creation of a commerce in other commodities which would justify the cost of the improvement or recompense local interests for the loss of logging privileges now enjoyed. From Logansport to Belzora the conditions are even less favorable for the realization of commensurate benefits from any improvement that might be undertaken by the United States.

In view of the facts briefly presented above, and more fully explained in the within report and others previously made, the Board concurs with the district officer and the division engineer in the opinion that Sabine River is not at present worthy of improvement by the General Government between the points specified in the act. Although interested parties were invited to submit statements and arguments to the Board, no communications in behalf of the improvement have been received in connection with the present investigation.

For the Board:

D. W. Lockwood,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 491.

STUYVESANT HARBOR, NEW YORK.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION, WITH PLAN AND ESTIMATE OF COST OF IMPROVEMENT, OF SHOAL OFF STUYVESANT HARBOR, HUDSON RIVER, NEW YORK.

JANUARY 13, 1908.—Referred to the Committee on Rivers and Harbors and ordered to be printed, with accompaning illustration.

WAR DEPARTMENT,
Washington, January 11, 1908.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated 10th instant, together with copies of reports from Col. John G. D. Knight, Corps of Engineers, dated September 24, and October 25, 1907, of a preliminary examination, with plan and estimate of cost of improvement, of shoal off Stuyvesant Harbor, Hudson River, New York, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectifully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

THE SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, January 10, 1908.

SIR: I have the honor to submit herewith for transmission to Congress reports of September 24, 1907, and October 25, 1907, with map, by Col. John G. D. Knight, Corps of Engineers, upon preliminary examination, with plan and estimate of cost of improvement, of shoal off Stuyvesant Harbor, Hudson River, New York, as authorized by the river and harbor act approved March 2, 1907.

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The plan of improvement proposed is to redredge the channel partially dredged by the State of New York in 1892, and leading southwesterly from the landing to the main channel, for a length of about 2,800 feet, width of 150 feet, and depth of 9 feet, at an estimated first cost of $25,116, and an average annual cost of $500 for maintenance after completion. In the opinion of Colonel Knight the locality is worthy of improvement by the General Government to this extent.

For the reasons given in its report of January 6, 1908 (also herewith), the Board of Engineers for Rivers and Harbors does not agree with the district officer in the belief that this locality is worthy of improvement by the General Government at this time.

I concur in the views of the Board of Engineers for Rivers and Harbors.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF SHOAL OFF STUYVESANT HARBOR, HUDSON RIVER, NEW YORK.

UNITED STATES ENGINEER OFFICE,
New York City, September 24, 1907.

GENERAL: I have the honor to submit the following report upon a preliminary examination of shoal off Stuyvesant Harbor, Hudson River, New York, made in compliance with Department letter dated March 14, 1907, and pursuant to the requirements of the river and harbor act of March 2, 1907, of which the following is an extract: "Hudson River: Shoal off Stuyvesant Harbor."

Stuyvesant is on the left, or east, bank of the Hudson River, 17 miles below Albany. The shoal off Stuyvesant Harbor is a middle ground separating Stuyvesant from the main channel one-quarter of a mile distant. A channel of from 100 to 150 feet in width and of not less than 9 feet depth at mean low water leads from the main channel around the north end of the middle ground to the steamboat landing at Stuyvesant; but egress downstream to the main channel is by either of two channels, of which the shorter, about 1,800 feet long, has a least depth of 2.2 feet, and the longer, about 3,500 feet long, a least depth of 4 feet. The former of these two was dredged out by private parties at a date unknown. The State of New York contracted for the removal of 37,000 cubic yards from the latter in 1892.

To reach and leave the landing by the upstream channel is difficult because of insufficient width, especially in stormy weather, and is of course tedious.

Reopening one or the other of the downstream channels is urged by the parties interested.

It has been found impracticable to ascertain the former traffic by boat from this landing. At present one boat touches, and its owners re considering taking it off because of difficulties of navigation. ot less impracticable is ascertaining definitely the existing comerce of the place.

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The tributary population is about 7,500. Its supplies of coal, flour, feed, farming implements, hardware, fertilizer, etc., are estimated at $30,000. Annual shipments of several thousand dollars' worth of small fruits are reported, as well as 50 to 60 barges of ice. Two firms report they anticipate daily shipments of in all about 110 to 160 tons of molding sand; a bottling firm, weekly shipments of $30 to $50 worth of stores. A cooperage concern and a knitting company are also interested.

With improved river facilities, residents believe new industries would be attracted.

Certainly water communication from Stuyvesant has become more and more difficult and rare, and both the State of New York and private parties have contributed to maintaining it. This consideration reinforces the moderate commercial advantages probably resulting from an improvement of the channel in leading me to at least defer reporting upon the advisability of the improvement until an estimate of cost of making it can be prepared.

With the available information derived from late surveys, it will be only necessary in preparing this estimate to prepare plans of any proposed channels and determine the amount of dredging involved. For this the sum of $50 will be ample, and its allotment for preparing an estimate of cost of improving the shoal off Stuyvesant Harbor is recommended.

Very respectfully, your obedient servant,

JOHN G. D. KNIGHT,
Colonel, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.

[Second indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., September 30, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

This is a harbor on the upper Hudson, access to which from the main channel is difficult, and those interested desire the improvement of one of the auxiliary channels leading thereto with a view to facilitating the movement of vessels to and from Stuyvesant dock. The fact of private parties and the State of New York having expended funds for the improvement of this locality indicates the importance of the improvement.

The district officer states it is desirable that the cost of the improvement be ascertained before reporting upon its advisability, and that an estimate can be prepared from data now available at an expense of not more than $50, and recommends an allotment for that purpose.

This appears to be a case where the advisability of the improvement is dependent in a great measure upon the cost of the work involved, and as this can be ascertained only by an estimate, the recommendation of the district officer is concurred in by the Board.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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[Third indorsement.]

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, October 2, 1907.

Respectfully submitted to the Secretary of War.

This is a report on preliminary examination of shoal off Stuyvesant Harbor, Hudson River, New York, authorized by the river and harbor act of March 2, 1907.

Inviting attention to the report of the Board of Engineers for Rivers and Harbors, in preceding indorsement, I recommend that preparation of plan and estimate of cost of improvement of the locality, as proposed, be authorized.

SMITH S. LEACH,
Acting Chief of Engineers.

[Fourth indorsement.]

WAR DEPARTMENT,
October 3, 1907.

Approved as recommended by the Acting Chief of Engineers.

ROBERT SHAW OLIVER,
Acting Secretary of War.

PLAN AND ESTIMATE OF COST OF IMPROVING SHOAL OFF STUYVESANT HARBOR, HUDSON RIVER, NEW YORK.

UNITED STATES ENGINEER OFFICE,
New York City, October 25, 1907.

GENERAL: Complying with the instructions of the Chief of Engineers, U. S. Army, dated October 5, 1907, I have the honor to submit the following report with plan and estimate of cost of improving the shoal off Stuyvesant Harbor, Hudson River, New York, as authorized by the Secretary of War October 3, 1907, and for which purpose the sum of $50 was allotted from the appropriation of March 2, 1907, for "Examinations, Surveys, and Contingencies of Rivers and Harbors."

Attention is invited to my report of September 24, 1907, on the preliminary examination of this shoal, ordered by the river and harbor act approved March 2, 1907. In this report is to be found a statement of commercial and other interests involved, so far as known to this office. In it I deferred reporting upon the advisability of the improvement until an estimate of cost of making this could be prepared.

The plan of improvement now proposed is to redredge the channel partially dredged by the State of New York in 1892, and leading southwesterly from the landing to the main channel, for a length of about 2,800 feet, width of 150 feet, and depth of 9 feet, as shown on tracing herewith.

The estimated cost of this dredging is:

Removal of 78,000 cubic yards, scow measurement, at 28 cents	$21,840
Engineering, supervision and contingencies, 15 per cent	3,276
Total	25,116

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Unless it be impaired by an ice gorge, this channel may, it is thought, be maintained at an average annual cost of $500; but any appropriation for maintenance should be made at this rate as needed, which will probably be at intervals of about four years.

Taking into consideration the details set forth in the report upon the preliminary examination and the cost of the improvement and its maintenance, I deem the shoal off Stuyvesant Harbor, Hudson River, New York, worthy of improvement by the General Government to the extent herein planned.

Very respectfully, your obedient servant,

JOHN G. D. KNIGHT,
Colonel, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.

[Second indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., January 6, 1908.

Respectfully returned to the Chief of Engineers, U. S. Army.

It appears from the within estimate that the work contemplated for the improvement of the Hudson River off Stuyvesant Harbor will cost $25,116 and that about $500 will be required annually thereafter for maintenance.

Information regarding the amount of commerce, present and prospective, to be benefited by the improvement is rather indefinite and unsatisfactory, the district officer stating in his report on preliminary examination that it was impracticable to secure precise data.

Realizing the advisability and necessity of securing more definite information, if obtainable, before submitting its final report, the Board requested, under date of November 4, 1907, that interested parties be invited to submit to the Board within three weeks, statements, arguments, and statistics setting forth the commercial necessity for the improvement and the amount and character of the commerce to be benefited thereby. All those believed to be concerned, ten persons and firms, were informed of the above by the district officer on November 8, 1907, but as yet no response has been received by the Board. This apparent absence of all interest in the questions involved would appear to indicate a lack of necessity for the improvement.

The estimated cost of the work is considerable, and in the opinion of the Board is excessive when compared with the probable benefits to result therefrom, as indicated from present knowledge of commercial conditions. The Board therefore can not concur with the district officer in the belief that this locality is worthy of improvement by the General Government at this time.

For the Board.

R. L. HOXIE,
Colonel, Corps of Engineers,
Senior Member Present.

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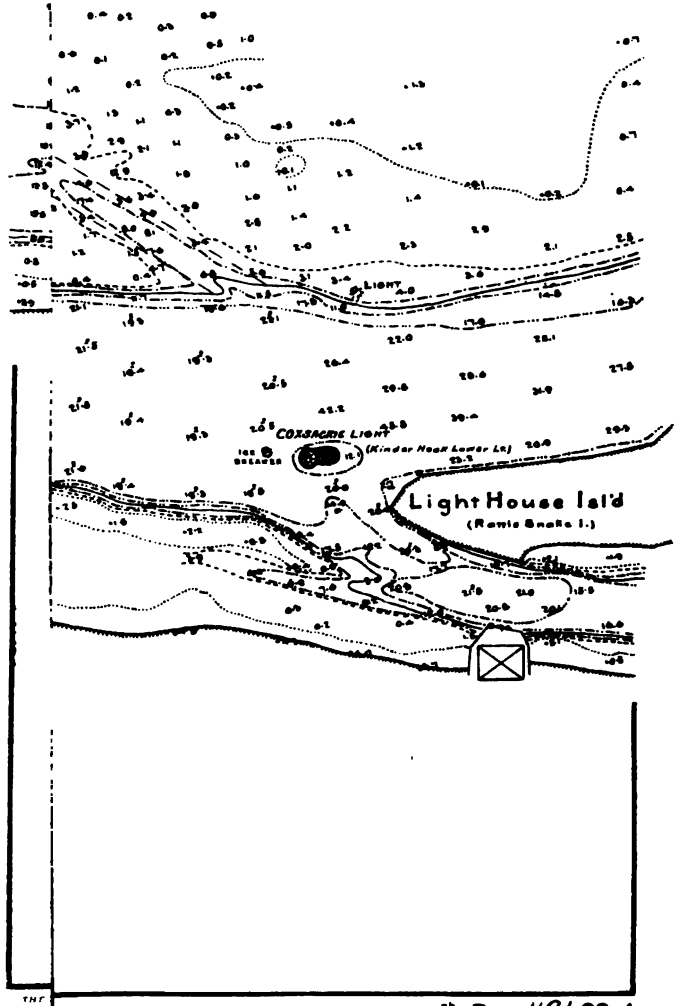

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 493.

BOIS DE SIOUX RIVER, LAKE TRAVERSE, AND BIG STONE LAKE, MINN. AND N. AND S. DAK.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF BOIS DE SIOUX RIVER, LAKE TRAVERSE, AND BIG STONE LAKE, MINN. AND N. AND S. DAK.

JANUARY 14, 1908.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, January 13, 1908.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated 10th instant, together with copy of a report from Maj. Francis R. Shunk, Corps of Engineers, dated December 4, 1907, of a preliminary examination of Bois de Sioux River, Lake Traverse, and Big Stone Lake, and the portages between the said lakes and river, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

WM. H. TAFT,
Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, January 10, 1908.

SIR: I have the honor to submit herewith for transmission to Congress report of December 4, 1907, by Maj. Francis R. Shunk, Corps of Engineers, on preliminary examination authorized by the river and harbor act approved March 2, 1907, of Bois de Sioux River, Lake Traverse, and Big Stone Lake, and the portages between the said lakes and said river, with a view to diverting the flood waters of the Red River of the North into the Minnesota River, Minnesota.

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From the facts and for the reasons given I concur in the opinion of the district officer, the division engineer, and the Board of Engineers for Rivers and Harbors that the flood waters of Red River of the North ought not to be deflected into the Minnesota River.

Very repectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF BOIS DE SIOUX RIVER, LAKE TRAVERSE, AND BIG STONE LAKE, AND OF THE PORTAGES BETWEEN THEM, WITH A VIEW TO DIVERTING THE FLOOD WATERS OF RED RIVER OF THE NORTH INTO MINNESOTA RIVER, MINNESOTA.

UNITED STATES ENGINEER OFFICE,
St. Paul, Minn., December 4, 1907.

GENERAL: 1. In compliance with department letter of March 14, 1907, I have the honor to submit report on a preliminary examination of Bois de Sioux River, Lake Traverse, and Big Stone Lake, and the portages between the said lakes and said river, with the view of diverting the flood waters of the Red River of the North into the Minnesota River.

2. Survey of these waters (with others) was made, in compliance with the river and harbor acts of 1899 and 1902, with a view to constructing reservoirs for the improvement of navigation in the Minnesota River. Report was submitted by Maj. R. L. Hoxie on August 11, 1903. (See Annual Report of the Chief of Engineers for 1904, p. 2260.) The present examination was made by Mr. R. Davenport, assistant engineer, in July, 1907.

3. There is only one portage between the waters in question, that between Lake Traverse and the Minnesota River.

4. The deflection of waters from the Red River into the Minnesota River can be effected only by building one or more dams and excavating a canal through the portage. The examination, accordingly, was made with a view to determining possible dam sites, and the feasibility of forming reservoirs which might discharge into the Minnesota River.

5. Bois de Sioux River has its source in Lake Traverse, and flows in a generally northerly direction for about 23 miles to Breckenridge, where it unites with Ottertail River, to form the Red River of the North. No suitable site for a dam was found on this river except just at the outlet of Lake Traverse.

6. Lake Traverse is a long, narrow body of water, extending generally in a northeasterly and southwesterly direction, about 25 miles long and from one-half to 2½ miles wide. The southern or upper end of Lake Traverse is only about 4 miles distant from the Minnesota River, and the portage lying between is so low that the waters of the lake and river frequently mingle at flood stages. There would be no special difficulty in excavating a canal through the portage. Lake Traverse might be dammed at its outlet, at the site above referred to, which is near the town of White Rock, or at a narrow place just below the mouth of Mustinka River. A dam at the former site would have to be about 1,600 feet long; at the latter site

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about 800 feet long. For deflection purposes only, one would be about as good as the other, since there are no tributaries to speak of north of the Mustinka, but should a reservoir be contemplated (as hereafter to be noticed) a dam at White Rock would give much greater capacity.

7. Big Stone Lake is an expansion of the Minnesota River. It extends in a generally northwesterly and southeasterly direction. Its upper end is about 4 miles, measured along the Minnesota River from the portage above mentioned. There is a suitable site for a dam at the outlet of the lake.

8. Between Lake Traverse and Big Stone Lake, on a site adjacent to the portage and only about 4 feet above known high water in Lake Traverse, is the village of Browns Valley, with about 200 inhabitants. There are farms on the banks of the two lakes and along the portage, and their number is steadily increasing. On the shores and islands of Big Stone Lake there are many summer cottages and several summer hotels. Many of these would be drowned out and all injuriously affected by a rise in the lake levels.

9. The drainage area of Lake Traverse is about 1,200 square miles. Its average annual outflow is unknown. Its outflow during the last great flood, that of 1897, is estimated at about 4,700,000,000 cubic feet in about fifty days. The conditions accompanying this flood were not the most unfavorable possible. The snowfall during the winter was normal and the thaw was not accompanied by rains. It is known that the flood of 1850 was 10 feet higher at Grand Forks, and it may well be that with unusually heavy snowfall and rapid melting accompanied by rains the flood outflow would reach 7,000,000,000 cubic feet in about fifty days.

10. The normal low-water elevation of Lake Traverse is 973 feet above sea level; its normal high-water level about 976.5 feet. Its highest known level was about 980 feet.

11. The drainage area of Lake Traverse might be increased by damming Ottertail River and digging a canal about 24 miles long from Ottertail River to Mustinka River, a tributary of Lake Traverse. If this were done, the total drainage area tributary to Lake Traverse would be about 3,200 square miles and the estimated maximum flood outflow about 18,300,000,000 cubic feet.

12. Should, therefore, the drainage area tributary to Lake Traverse be increased by artificial means, the maximum amount of water to be considered in planning deflection works would be 18,300,000,000 cubic feet. If this drainage area be not increased, the maximum amount to be considered would be 7,000,000,000 cubic feet. The examination indicates that Lake Traverse could not be raised more than 11 feet above its mean low-water level. With such rise a dam at Mustinka would form a reservoir having a capacity of about 5,268,250,000 cubic feet; a dam at White Rock would form a reservoir having a capacity of about 10,116,394,000 cubic feet. The latter would be more than sufficient to hold the greatest flood outflow of the natural drainage area, but would hold only about 55 per cent of the maximum outflow of the increased drainage area, which would then have to escape or be stored elsewhere. With a rise of 8 feet above mean low level, a dam at White Rock would form a reservoir having a capacity of about 7,000,000,000 cubic feet, or enough to hold the maximum outflow from the natural drainage area. With a rise of 11 feet above mean low level, a dam at White Rock would

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form a reservoir having a capacity of about 4,016,322,000 cubic feet, or almost enough to hold the outflow of the flood of 1897.

13. Simple deflection of the flood waters of the Red River into the Minnesota River is out of the question. The high stages in the two rivers occur at about the same time, and any benefits to the Red River Valley resulting from the deflection will be offset by damages to the Minnesota Valley. The farms along the portage and the village of Browns Valley might also be washed away. Provision must therefore be made for a dam at the upper or south end of Lake Traverse, making of the lake a reservoir whose waters could be discharged as conditions permitted.

14. In connection with some of the cases above mentioned, the storage of the surplus water, or part of it, in Big Stone Lake may be considered. This lake has a drainage area of about 1,232 square miles. Its average annual outflow is about 1,000,000,000 cubic feet. Nothing definite is known of its flood outflow, but, since its drainage area is almost the same as that of Lake Traverse and the two basins are very similar in essential characteristics, the flood outflow may perhaps be taken as the same, viz, 7,000,000,000 cubic feet.

15. The examination indicates that a rise of 12 feet above the normal low-water level is the maximum possible in Big Stone Lake. With such rise a dam at the outlet would form a reservoir having a capacity of about 7,000,000,000 cubic feet, or just about enough for its own maximum flood waters.

16. In estimating the advantages to be derived from retention of the flood waters distinction must be made between ordinary and exceptional floods. During normal years there is no general overflow of the Red River. The banks are of such height that they could contain the normal high-water discharge were it not for ice jams. The ice first breaks in the upper parts of the river and forms dams which cause local overflows, with some erosion and considerable damage to buildings and crops. At irregular intervals (1850, 1882, 1893, 1897) there have been great floods, inundating the country for miles. Ice jams have nothing to do with these floods, which are caused by unusually rapid melting of the winter snow. These extensive inundations do great damage. It was estimated by the Tri-State Drainage Association that, without including depreciation of land values, hardship, danger, and expense of moving, the flood of 1897 caused losses aggregating $4,531,963. As the population of the river valley is steadily increasing, it may be expected that greater losses will result from the next similar flood.

17. Approximate estimates indicate that the total quantity of water which passed Grand Forks during the flood of 1897 above the level of bankfull river was 18,000,000,000 cubic feet. The total discharge of Lake Traverse during this flood was 4,700,000,000 cubic feet. Had this entire discharge been withheld, the excess flood water at Grand Forks would have been diminished by 26 per cent, below Grand Forks by decreasing percentages, and above Grand Forks by increasing percentages, reaching 100 per cent at some unknown point, above which the Red or Bois de Sioux River would not fill its banks. The percentage of area uncovered by such diminution would not, of course, have been so great as the percentage of diminution of water.

18. With the possible increase of drainage area tributary to Lake Traverse, the estimated outflow during a flood equal to that of 1897

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would be 12,500,000,000 cubic feet. The most capacious reservoir which could be built at Lake Traverse would arrest only 10,116,394,000 cubic feet. This would diminish the excess flood water at Grand Forks by about 56 per cent, with decreasing percentages downstream and increasing percentages upstream, as before. In greater floods than that of 1897, such as have occurred and will probably occur again, the percentage of diminution, and of consequent benefit, would be less than above given, as the capacity of a possible reservoir is limited.

19. On the whole, it would seem that the deflection or impounding of the outflow from Lake Traverse would not prevent extraordinary floods in the Red River, but, assuming the enlarged area, would noticeably diminish them as far as Grand Forks, and probably for some distance below that town.

20. The artificial enlargement of the drainage area of Lake Traverse has been considered only because deflection of water into the Minnesota River is contemplated by the act. I do not think that such enlargement is to be recommended. So far as improving flood conditions in the Red River is concerned, it would be far better to make a separate reservoir in the Ottertail basin; but this question can not be considered under the present act.

21. The cost of the works necessary in order to carry out the plan indicated in the act would be very great. In addition to the cost of the works themselves, extensive flowage rights would have to be acquired. A rise of 11 feet above low water in Lake Traverse would overflow a tract of about 15 square miles, much of it valuable land and containing a number of farms. The value of property affected around Big Stone Lake would be even greater, were a rise in the lake levels contemplated.

22. It is my opinion that the flood waters of Red River ought not to be deflected into the Minnesota River. The occasional great floods in the Red River can be controlled, if at all, only by a system of reservoirs, of which Lake Traverse would form one. It is of great moment to the inhabitants of the Red River Valley that these destructive floods should be controlled, and I think that the question of reservoirs should be fully investigated, with careful estimates. But, with regard to the present examination, I recommend that no works be undertaken with a view of deflecting the flood waters of the Red River of the North into the Minnesota River.

Very respectfully, your obedient servant,

FRANCIS R. SHUNK,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

OFFICE DIVISION ENGINEER, NORTHWEST DIVISION,
Chicago, Ill., December 11, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army.

I concur in the opinions and recommendations of Major Shunk as given by him in paragraph 22.

W. H. BIXBY,
Lieut. Col., Corps of Engineers,
Division Engineer, Northwest Division.

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[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., January 6, 1908.

Respectfully returned to the Chief of Engineers, U. S. Army.

It appears from a review of the within report and such other information as is available that to attain the results contemplated in the act, namely, "diverting the flood waters of the Red River of the North into the Minnesota River," would require works of considerable magnitude which could be carried out only at large expense and would involve the overflow of much valuable farming land. It also appears that the advantages to be gained from such lowering of the flood heights in the Red River as would be effected by the proposed improvement would be offset by a corresponding aggravation of the flood conditions in the Minnesota River.

The problems involved are intricate and the probable results doubtful. In the opinion of the Board the benefits would not be commensurate with the cost, and therefore it concurs with the views of the district officer and the division engineer that the flood waters of the Red River ought not to be deflected into the Minnesota River. However, attention is invited to the report of the district officer in which he states that it would appear that by a suitable system of reservoirs some amelioration of flood conditions in these rivers might possibly be obtained and recommends that the question of reservoirs should be fully investigated. It does not appear that such an investigation is possible under the provision of law above quoted.

Interested parties were notified by the district officer to submit statements and arguments to the Board bearing upon the necessity and advisability of the United States undertaking the proposed improvement, but no communications have been received.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 503.

THREEMILE HARBOR TO GARDINERS BAY, NEW YORK.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF CHANNEL BETWEEN THREEMILE HARBOR AND GARDINERS BAY, NEW YORK.

JANUARY 15, 1908.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, January 14, 1908.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated 13th instant, together with copy of a report from Col. John G. D. Knight, Corps of Engineers, dated August 8, 1907, of a preliminary examination of channel between Threemile Harbor and Gardiners Bay, New York, made by by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

WM. H. TAFT,
Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, January 13, 1908.

SIR: I have the honor to submit herewith for transmission to Congress report of August 8, 1907, by Col. John G. D. Knight, Corps of Engineers, on preliminary examination of channel between Threemile Harbor and Gardiners Bay, New York, as authorized by the river and harbor act of March 2, 1907.

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From the facts and for the reasons given I concur in the opinion of the district officer and the Board of Engineers for Rivers and Harbors that this locality is not worthy of improvement by the General Government at the present time.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF CHANNEL BETWEEN THREEMILE HARBOR AND GARDINERS BAY, NEW YORK.

UNITED STATES ENGINEER OFFICE,
New York City, August 8, 1907.

GENERAL: I have the honor to submit the following report upon a preliminary examination of the channel between Threemile Harbor and Gardiners Bay, made in compliance with Department letter dated March 14, 1907, and pursuant to the requirements of the river and harbor act of March 2, 1907, of which the following is an extract: "Channel between Three Mile Harbor and Gardiners Bay."

Attention is invited to coast charts Nos. 114 and 115 of the United States Coast and Geodetic Survey and to the topographical sheets of the United States Geological Survey, showing the Gardiners Island and East Hampton quadrangles of Suffolk County, N. Y.

The improvement of Threemile Harbor and of its connection with Gardiners Bay is urged by residents of East Hampton, Amagansett, and Springs, Long Island, by persons engaged in navigation and working in various occupations on the bays at the eastern end of Long Island, by others engaged in oyster culture in these bays, by the Greenport and East Hampton boards of trade, and by owners of many pleasure boats.

The distances to landings in Threemile Harbor are: From East Hampton, 2½ miles; Amagansett, about 5 miles, and Springs, 1½ miles.

The population of these three is given respectively as about 2,500, 900, and 500, with a summer increase of the first of 2,400.

It is stated that, with the purchase of the Montauk Steamboat Company by the Long Island Railroad Company, all water competition with the Long Island Railroad has ceased.

The oystermen urge that the improvement of this harbor will furnish a safe place of refuge in time of bad weather in the immediate vicinity of the oyster grounds, though the entrance to Sag Harbor is but 4 miles to the west and the preponderance of oyster grounds nearer Sag Harbor.

The incoming and outgoing freight by rail of the three villages above named is reported by a citizen of East Hampton as follows:

Incoming.

	Tons.
General merchandise	2,155
Hardware and plumbers' supplies	525
Blacksmiths' and wagon-workers' supplies	101
Fertilizer	365
East Hampton Lumber Company	18,075
Miscellaneous	1,158
Hay and grain	3,125
Stone	500
Manure	350

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Outgoing.

	Tons.
Produce	1,625
	27,979
Cord wood (cords)	11,000

Also that 30,000 tons of stone have been brought by railroad to East Hampton and applied to road construction and that 35,000 tons more are needed for the same purpose in the near future.

The present channel is about 50 feet wide at entrance, with a low-water depth of 7 feet, except for an inner bar about 60 feet long, over which there is but 3 feet. Outside of the entrance is a bar over which is a depth of about 5 feet for a width of 25 feet. The average height of high water at Montauk Point, 18 miles to the east, is 1.9 feet.

A channel 100 feet wide and at mean low water 8 feet deep is desired and petitioners urge that it be cut through the west end of Sammys Beach, because the deeper water of the harbor is in its western half and they think that with jetties the channel could be maintained through the beach. The latter above high water is about 400 feet wide and the sand hommocks rise to a height of 10 feet. The new channel would be in all about 1 mile long; the existing channel is crooked and about the same length.

I am informed that the owners of Samnys Beach would doubtless deed to the United States the land traversed by the desired cut, though I have no assurance of this from the owners themselves.

The present water-borne commerce of the harbor is very small. Neither it, nor the prospective diversion of rail-carried freight to the water route, nor the necessities of a harbor of refuge off of main lines of traffic, will justify the probable cost of the desired improvement and its cost of maintenance. In my opinion the channel between Threemile Harbor and Gardiners Bay is not worthy of improvement.

Attention is invited to the unfavorable report of a preliminary examination of this harbor, printed on pages 1454 and 1455 of Part II of the Report of the Chief of Engineers, 1900.

Very respectfully, your obedient servant,

JOHN G. D. KNIGHT,
Colonel, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.

[Second indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., September 3, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

The physical characteristics of this harbor are very well described in a report on a former preliminary examination, printed as House Document No. 62, Fifty-sixth Congress, first session. The improvement desired is a navigable channel connecting this almost land-locked harbor with deep water in Gardiners Bay. There are three villages located 1½, 2½, and 5 miles distant, respectively, from the harbor, whose population aggregates 3,500. These and a number of oystermen are said to be interested in the proposed improvement, the object of which is to create competition in freight transportation and to afford shelter for oyster boats and pleasure craft.

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The commerce of the vicinity, which is now carried by rail, is reported to amount to about 28,000 tons. What part of this would probably be diverted to a water route if the harbor were improved is not stated. The shores of the harbor are practically unpopulated, and there are now no facilities for the receipt or shipment of commerce. Before any traffic could be expected to develop, suitable roads would have to be constructed to the villages, and wharves, landings, and warehouses would have to be built. All the business would then have to be hauled over the country roads by teams. The Board does not believe that under these conditions any considerable amount of commerce would develop at this harbor, and certainly not enough to warrant the cost of the proposed improvement, which, to be given any degree of permanency, would require the protection of expensive jetties.

It is the opinion of the Board, concurring with the views of the district officer, that the improvement of Threemile Harbor by the United States is, under existing conditions, inadvisable.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 515.

NORTH FORK, EDISTO RIVER, SOUTH CAROLINA.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF NORTH FORK, EDISTO RIVER, SOUTH CAROLINA, FROM ITS MOUTH TO ORANGEBURG.

JANUARY 17, 1908.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, January 15, 1908.

SIR: I have the honor to transmit, herewith, a letter from the Chief of Engineers, U. S. Army, dated 13th instant, together with copy of a report from Capt. G. P. Howell, Corps of Engineers, dated July 20, 1907, of a preliminary examination of North Fork, Edisto River, South Carolina, from its mouth to Orangeburg, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

WM. H. TAFT,
Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, January 13, 1908.

SIR: I have the honor to submit herewith for transmission to Congress report of July 20, 1907, by Capt. G. P. Howell, Corps of Engineers, on preliminary examination authorized by the river and harbor act approved March 2, 1907, of North Fork, Edisto River South Carolina, from its mouth to Orangeburg, with a view obtaining 3 feet of water.

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From the facts and for the reasons given I concur in the opinion of the district officer, the division engineer, and the Board of Engineers for Rivers and Harbors that this locality is not worthy of improvement by the General Government at the present time.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF NORTH FORK, EDISTO RIVER, SOUTH CAROLINA, FROM ITS MOUTH TO ORANGEBURG.

UNITED STATES ENGINEER OFFICE,
Charleston, S. C., July 20, 1907.

GENERAL: I have the honor to submit the following report upon a preliminary examination of the North Fork, Edisto River, from its mouth to Orangeburg, with a view to obtaining 3 feet of water, as prescribed in section 3 of the river and harbor act of March 2, 1907.

The same act ordered an examination of the South Fork, Edisto River. The report[a] upon this examination has been forwarded in separate communication on this date. A general description of the Edisto River and of the improvements and examinations made by the Federal Government has been given in that report. In 1884 an examination was made under the direction of Colonel Gillmore of the North Fork in the counties of Orangeburg and Lexington, S. C. (Report of the Chief of Engineers, 1888, p. 991). The cost of clearing out the obstructions was estimated at $93,000, while the removal of shoals and straightening the bends would greatly increase the expense. It was reported that the river was not worthy of improvement. When the Edisto River was under improvement, between 1882 and 1893, no work was done on the North Fork until the river and harbor act of 1890, in appropriating $5,000 for this improvement, contained a requirement that the money should be spent in equal portions on the North and South forks. With this $2,500 the North Fork was roughly cleared for raft navigation for width of 60 feet and depth of 18 inches at low water between Orangeburg bridge and 8 miles below.

The North Fork is formed by the junction of two creeks in Lexington County, about 35 miles in a straight line above the city of Orangeburg. Its course from the junction to Orangeburg is southeast, and from Orangeburg it flows south for a distance in a straight line of about 15 miles until it unites with the South Fork. The distance by river between these points is given in Colonel Gillmore's report as 49 miles, but this is undoubtedly too great, as it was obtained from rivermen, who always exaggerate distances on the water. An examination was made of this portion of the North Fork by myself. I drove to the river at Orangeburg and at Felders, 4 miles below; and from Rowesville, 8 miles below Orangeburg, to the junction the river was gone over in a small boat.

At the Orangeburg bridge the river is 65 feet wide and 5 feet deep. The banks are stable, from 3 to 4 feet above low water, and as the color of the water is dark, it shows that there is no washing of the

[a] Printed in House Doc. No. 516, Sixtieth Congress, first session.

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banks and little sediment in the stream. At Rowes bridge, 4 miles from Rowesville, the width has increased to 75 feet and the depth to 8 feet. There were few obstructions at this point. It took the small boat three hours and fifteen minutes to go from Rowes bridge to the South Fork. The width gradually increased to about 100 feet and the depths remained good. A number of obstructions were noted, especially log rafts that had gone to pieces, but which could be floated out at a higher stage. There are numerous sand bars in the bed of the stream, which at times reduce the width to 30 or 40 feet, but these bars never form entirely across the stream, and it was stated that there is never less than 4 feet of water in the channel. Parties who are familiar with both forks state that the North Fork carries the more water.

The examination of the South Fork was made to determine its availability for rafting purposes, while the improvement desired for the North Fork is of an entirely different character. It is desired that the Edisto River as far as Orangeburg be made navigable for steamboats, thus placing that city in direct water communication with Charleston and northern ports. There is no other city or town along the route, and the other interests, agricultural or commercial, that would be served by steamboats are too small to be considered. The only question to be settled is whether the cost of forming this channel is justified by the resulting benefits to Orangeburg. The Business Men's League of Orangeburg has procured for me information along this line, and its letter accompanies this report.

The present population of Orangeburg is between 8,000 and 10,000. The manufactories comprise two cotton mills with value of annual products $703,200; one oil mill (cotton-seed oil) with value of annual products $100,000; one ice plant with $10,000 annual products, and two lumber plants with $150,000 annual products, and a manufacturer of drugs and medicines with $10,000 annual products. Besides these are two wagon factories, one brick plant, and two bottling plants. There are five banks in the city, with average deposits of $1,250,000 and $380,000 combined capital and surplus. The cotton receipts amount to 20,000 bales. The annual value of all these industries is almost $2,000,000.

Two railroads pass through the city—the Southern Railway between Charleston and Columbia, and the Atlantic Coast Line between Florence and Augusta. By railroad, Orangeburg is 80 miles from Charleston, 49 miles from Columbia, and 84 miles from Augusta.

It is evident that Orangeburg is a thriving place, and if situated on a large stream would probably carry on a large amount of its trade by water. Reference is made to the reduction of freight rates between Savannah and Augusta, owing to the opening of the Savannah River to navigation. As stated in the inclosure from the secretary of the Chamber of Commerce of Augusta, the boat line does not pay any dividends, but the saving in freight charges has been sufficient to keep up the service. In other words, the railroads have reduced their freight rates. But the conditions are not the same at Orangeburg. The Savannah River is a wide stream, and the channel to be formed is 5 feet deep and 80 feet wide. It is navigated by boats 150 feet long and from 30 to 40 feet wide. A steamboat runs to Columbia on the Congaree River, where the channel is to be 100 feet wide; its

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length is 126 feet and breadth 30 feet. The river just at Columbia is not yet navigable, and the landing is a few miles from the city—about the same distance as it would be from Orangeburg. Owing to this distance, the owners of the boat state that the line would never have been built had the stockholders known that it would be so long a time before the boat could reach the city. On the Great Pedee River the condition is the same. Where the channel depths are small the boats must be wide in order to carry freight on the small draft allowed.

The entire width of the North Fork is not as much as it is in the channels of these streams that are under improvement. To form this channel in the North Fork would be an expense too great to be considered. It is probably feasible to make a channel 30 or 40 feet wide. In the main river below the junction the sand and marl shoals reduce the width to about 30 feet, as stated in the report upon examination of the South Fork. As the river is quite crooked, the boats could not be long. Probably gasoline boats could be used, the tonnage of which would vary from 15 to 25 tons. Their business would be confined to hauling fertilizer and farm products. It is not believed that manufactured cotton goods or incoming general merchandise would be handled this way. As to the 20,000 bales of cotton handled at Orangeburg and grown along the river, attention is invited to the fact that 16,000 bales of this were shipped to Wilmington, N. C., for export. As the distances by rail to Wilmington and Charleston are 193 and 80 miles respectively, it is seen that accessibility to a port does not always govern shipments.

In my opinion the improvement of the North Fork of the Edisto River with a view to obtaining 3 feet at Orangeburg is not a project to be undertaken by the Government at the present time.

Very respectfully,

G. P. HOWELL,
Captain, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

OFFICE OF DIVISION ENGINEER, SOUTHEAST DIVISION,
Savannah, Ga., July 22, 1907.

Respectfully submitted to the Chief of Engineers, U. S. Army.

I concur with the district officer in his opinion that the North Fork of the Edisto River is not worthy of improvement by the General Government at this time.

DAN C. KINGMAN,
Lieut. Col., Corps of Engineers,
Division Engineer, Southeast Division.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., December 23, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

The North Fork of the Edisto is a narrow and tortuous stream, having fairly good depths for the most part but occasionally being obstructed by bars, sunken logs, and rafts that reduce its navigable

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capacity both in width and depth. Owing to its crookedness and narrowness, small boats only could be used even if the waterway were improved, unless the project contemplated making a number of cut-offs and widening and deepening the channel itself in many places, plainly a work of greater magnitude than appears warranted by the interests involved.

This section of river connects with the South Fork of the Edisto, over which the commerce would have to pass for a distance of about 180 miles to its mouth. This main trunk of the Edisto is not under improvement. It is shallow and obstructed, and is used only as a rafting stream, there being little or no commerce originating on its banks. The commerce to be affected by the improvement now under consideration is therefore only that pertaining to the vicinity of Orangeburg.

So long as the stretch of shallow and obstructed waterway exists below the mouth of the North Fork, it will not, in the opinion of the Board, be practicable to operate successfully a steamboat line between Orangeburg and Charleston, the natural outlet for any water-borne commerce of this section of country, and the local improvement of the North Fork would not result in benefits commensurate with the cost. In view of the facts stated above, the Board concurs with the district officer and the division engineer in the opinion that it is inadvisable for the United States to undertake the improvement of the North Fork of the Edisto River at this time.

As a result of an invitation extended to interested parties to submit statements and arguments to the Board, Hon. A. F. Lever and Hon. J. O. Patterson, Members of Congress, appeared before the Board on December 16, 1907, in behalf of the improvement.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

LETTER OF THE ORANGEBURG BUSINESS MEN'S LEAGUE.

ORANGEBURG, S. C. *June 14, 1907.*

DEAR SIR: The undersigned, being a committee appointed by the Business Men's League of this city to specifically reply to your favor of the 20th ultimo, to Mr. R. H. Jennings, president of the Business Men's League, beg leave to report as follows:

Value of the products and number of spindles of the cotton mills located here.

ORANGEBURG MANUFACTURING COMPANY.

Number of spindles	14,000
Number of looms (draper)	400
Value of annual products	$360,000
Number of pounds produced	1,200,000

ORANGE MILLS.

Number of spindles	5,500
Value of annual products	$343,200
Number of pounds produced	1,560,000

LUMBER.

Value of finished products	$150,000

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OIL MILL.

Value of annual products..... $100,000

ICE PLANT.

Value of annual products..... $10,000

THE J. G. WANNAMAKER MANUFACTURING COMPANY (DRUGS AND MEDICINES).

Value of annual products..... $10,000

BANKS.

There are five banks in the city. One of these is small, and is run by negroes.

Average deposits..... $1,250,000
Combined capital and surplus..... 380,000

SHIPMENTS OF COTTON.

The cotton receipts of this city (in round numbers) amount to 20,000 bales. Sixteen thousand bales of cotton were shipped via the Atlantic Coast Line from this point the past season. Most of this cotton went to Wilmington, N. C., to be exported from that city. We feel sure that with water connection with Charleston a great majority of this cotton would be shipped via boat to Charleston for export. The value of this staple varies, of course, but at $50 per bale this would amount to $1,000,000.

RECAPITULATION.

	Spindles.	Looms (draper).	Pounds.	Annual value.
Orangeburg Manufacturing Company	14,000	400	1,200,000	$360,000
Orange Mills	5,500	.....	1,560,000	342,200
Lumber plants	.....	.....	.....	150,000
Oil mill	.....	.....	.....	100,000
Ice plant	.....	.....	.....	10,000
Drugs and medicines	.....	.....	.....	10,000
Cotton shipped annually	.....	.....	.....	1,000,000
Total	19,500	400	2,760,000	1,973,200

Banks average deposits and capital and surplus, $1,630,000.

FARM PRODUCTS ALONG RIVER TO BRANCHVILLE.

We have no accurate report as to this; but there are numerous large planters along this territory near the river (some of whom have been interviewed as to whether they could haul cotton, etc., to boat landings on account of swamp) who could and would ship via boat, as they state that wherever a settlement occurs along the river there is always a corresponding bluff or landing near by. As to character of products, we estimate (from our personal acquaintance with these farmers) that they market about 20,000 bales of cotton annually besides a considerable amount of lumber. The increase of the lumber business would be great, of course, if the proposed channel is provided.

FERTILIZERS.

We estimate that at least 10,000 tons of fertilizer materials would be shipped from Charleston annually to points between that city and Orangeburg via boats, and the freight rate on such would be, in our opinion, practically cut in half.

COMPARATIVE SAVING IN FREIGHTS.

We herewith attach (as a part of this report) a letter from the secretary of the Chamber of Commerce of Augusta, Ga., as to the reduction in freight rates between Augusta and Savannah resulting from the boat line on the Savannah River between these two points. We have written to the secretary of the Chamber of Commerce of Columbia, S. C., but as yet have not received a reply.

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THE PROBABILITY OF A BOAT BEING PROVIDED FOR THIS WATERWAY.

The undersigned will provide a boat to run between here and Charleston as soon as the Edisto River is made navigable. All of which is respectfully submitted for your consideration.

Respectfully, yours,

R. H. JENNINGS,
M. O. DANTZLER,
T. H. WANNAMAKER,
W. G. SMITH,
P. H. MOSS,
Committee of Business Men's League of Orangeburg, S. C.

Capt. G. P. HOWELL,
Corps of Engineers.

LETTER OF THE CHAMBER OF COMMERCE OF AUGUSTA, GA.

JUNE 1, 1907.

DEAR SIR: Your communication of May 24 is received. The boat line on the Savannah River between Augusta and Savannah has resulted in a marked reduction in the freight rates between the two points mentioned. The boat line has never paid any direct dividends, but is supported by the wholesale merchants of Augusta, and the saving in freight charges on heavy shipments has been sufficient to warrant a continuation of the service. Practically all of the heavy freight from the east is handled via Savannah and the boat line to Augusta. The United States Government is working almost continuously in the effort to provide a permanent 5-foot channel, a considerable appropriation having been passed during the last session of Congress.

Very truly, yours,

W. J. MOORE, *Secretary.*

Mr. M. O. DANTZLER,
(Care Business Men's League, Orangeburg, S. C.)

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 516.

SOUTH FORK, EDISTO RIVER, SOUTH CAROLINA.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF SOUTH FORK, EDISTO RIVER, SOUTH CAROLINA, FROM ITS MOUTH TO SCOTTS BRIDGE.

JANUARY 17, 1908.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, January 15, 1908.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated 13th instant, together with copy of a report from Capt. G. P. Howell, Corps of Engineers, dated July 20, 1907, of a preliminary examination of South Fork, Edisto River, South Carolina, from its mouth to Scotts bridge, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

WM. H. TAFT,
Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, January 13, 1908.

SIR: I have the honor to submit herewith report of July 20, 1907, by Capt. G. P. Howell, Corps of Engineers, on preliminary examination of South Fork, Edisto River, South Carolina, from its mouth to Scotts bridge, as authorized by the river and harbor act of March 2, 1907. In the opinion of Captain Howell, concurred in by the division engineer, Lieut. Col. Dan C. Kingman, Corps of Engineers, this stream is worthy of improvement to the extent of making it a good rafting river, and recommendation is made that an estimate be prepared of the cost of improvement to this extent.

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From the facts and for the reasons given in its report (also herewith), the Board of Engineers for Rivers and Harbors is of the opinion that the proposed improvement of this locality is not worthy of being undertaken by the United States.

The Chief of Engineers is constrained to adopt the views of the Board of Engineers for Rivers and Harbors that the South Fork, Edisto River, does not at this time promise benefits to its navigation interests commensurate with the cost of securing them, and must, under the requirements of the law, hold that the locality is not worthy of improvement by the United States. The work most urgently needed is snagging, and the thought is suggested that a number of streams of this character, each not worthy of improvement when considered alone, may at a later date, when a more adequate equipment of snag boats is available, be improved at a justifiable cost by the temporary services of a boat, the cost and up-keep of which is shared by several localities.

I therefore recommend that no further examination be ordered at this time, and that this report be transmitted to Congress.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF SOUTH FORK, EDISTO RIVER, SOUTH CAROLINA, FROM ITS MOUTH TO SCOTTS BRIDGE.

UNITED STATES ENGINEER OFFICE,
Charleston, S. C., July 20, 1907.

GENERAL: I have the honor to submit the following report upon a preliminary examination of the South Fork, Edisto River, from its mouth to Scotts bridge, as prescribed in section 3 of the river and harbor act of March 2, 1907.

The Edisto River proper, or the main river, is formed by the junction of the North and South forks on the southern border of Orangeburg County, a large and important county south of the center of the State. The junction point is about 6 miles west of Branchville, on the Southern Railway line to Augusta, Ga. From this point the Edisto River flows southeast and then south until it empties into the Atlantic Ocean just north of St. Helena Sound. For the purposes of the examination the mouth of the main river is regarded as the mouth of the South Fork, the point where, under the act, the examination is to extend.

The first examination of this stream by the Federal Government was made in 1880 under Col. Q. A. Gillmore, Corps of Engineers, whose report was published in the Annual Report of the Chief of Engineers, 1881, page 1138. He recommended that the main river and the South Fork, as far as Guignards Landing, be improved at an estimated cost of $33,385. Guignards Landing is about 77 miles above the junction. The plan of improvement contemplated light-draft steamboats from the sea to the junction of the two forks and rafts and flatboats above. The full amount of the estimate was ultimately appropriated and expended, and in the Annual Report for 1896 the district officer reported that no further work would be done; that

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the improvement had been successful, and that maintenance was not recommended as the work done had allowed the available timber to come out and there was nothing else of value left. No steamboat or flatboat navigation had been developed; no attempt had been made to increase the original depths by dredging. Obstructions had been removed and secondary channels closed.

The district officer in the report referred to was speaking entirely about yellow pine timber, which had practically been all marketed. The demands for lumber had subsequently made other kinds of timber growing along the river valuable, such as short-leaf pine and cypress; and in the river and harbor act of June 13, 1902, another examination of the Edisto River was ordered from the mouth to the Aiken and Edgefield line. This examination disclosed the fact that there was considerable timber—300,000,000 or 400,000,000 feet board measure—that could be rafted down the river, and the district officer recommended that a survey be made to determine the cost of continuing the improvement for rafting purposes. It is evident, of course, that since the cessation of the work in 1893 the channel had become badly obstructed. This recommendation was concurred in by the division engineer, but the Board of Engineers for Rivers and Harbors, after having held a public meeting in Charleston, S. C., on June 17, 1903, of which due notice was given and at which interested parties failed to avail themselves of the opportunity to present their views in favor of the proposed improvement, decided that—

Having in mind that to facilitate the removal of the remaining timber upon the upper Edisto is a matter of at least doubtful public policy; that no improvement of this stream at reasonable cost would be of a permanent nature; that no general navigation is expected to result from any improvements proposed; that the greater portion of the good timber has probably already been removed, and that the lower portion of the river is still useful for logging purposes, the Board is of opinion that it is not advisable for the United States to undertake the further improvement of this river.

The report of this preliminary examination is given in the Annual Report of the Chief of Engineers, 1904, page 1585.

An examination was made of the South Fork by myself and Assistant Engineer James P. Allen May 1 and 2, 1907, and of the river below the junction May 28–30. Scotts bridge is in Aiken County, about 12 miles east of Aiken, on a road lately improved by the county. It is about 15 miles below the Aiken-Edgefield line, the limit of the examination in 1902. The river at this bridge was found to be a small, clear-water stream, overgrown with trees and underbrush, about 35 feet wide and 6 feet deep. There is little timber, and the river is too insignificant to be further considered. Shortly below this bridge a tributary, Shaws Creek, enters from the south, bearing almost as much water as the river itself. The next point visited was the county bridge near Springfield. This place is on the Southern Railroad between Columbia and Savannah, about 25 miles below Scotts bridge. Here the river is 60 feet wide and flows through a swamp one-half to three-quarters of a mile wide. There are numerous trees, cypress, swamp pine, and gum predominating.

The river was inspected in a bateau from Hopps Turn Hole near Bamberg down to the junction and thence to Jacksonboro. At Hopps Turn Hole the river is about 100 feet wide and has reached respectable proportions. From the junction to Jacksonboro, the crossing of the Atlantic Coast Line Railroad between Charleston and

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Savannah, the distance is variously stated, being given in one report as 144 miles and on a map made while the improvement was going on as 74. The width gradually increases from 125 feet to 300 feet at Jacksonboro. Just above Jacksonboro, at the "Dividance," the influence of tide water is felt and the river changes its characteristics, widening from 200 feet to 300 feet, and becoming sluggish. It is stated that there are no obstructions in the channel below Jacksonboro. From Jacksonboro to the mouth of the river the distance is about 40 miles. Fifteen miles below Jacksonboro a stream known as Dawho River flows around the northern side of Edisto Island. This point is practically the end of the Edisto River, at least as far as examining it for improvement is concerned, for all commerce down the river goes through Dawho to Charleston through the inland waterway. The portion of the river below this is known as South Edisto River, and is used as a link in the inland waterway between Charleston and Savannah by coastwise traffic.

The examination was made when the Weather Bureau gauge at Edisto station read 3 feet. In the lower river the stage was probably about 30 inches above dead low water. The Edisto is a dark-water stream, flowing in its upper section through low swampy land where the banks are low. Freshets rise to a height of 5 feet when the bottom land is entirely covered. In the lower section the banks are higher and the swamps have disappeared. Cultivated land comes down to the river. The freshets here rise to about 8 feet. The river carries little clay in suspension and hence is not muddy, but it has considerable sand or gravel. At the lower end, just above Dawho River, there are large deposits of sand, known as "Ponpon gravel"—Ponpon being another name for this section of river—where most of the building sand in Charleston is obtained. There are consequently numerous sand bars in the river, being found generally at each convexity. These bars do not as a rule extend across the channel, which is generally 5 feet deep at low water and 75 to 100 feet wide; but in one instance, known as "The Sands," the bar reduces the depth to 2 or 3 feet and the width to 20 or 30 feet. Again, about 10 miles above Jacksonboro, at Parkers Ferry, the depth is reduced to 4 feet and the width to 25 feet. Steamboats are prevented from going any higher.

The chief characteristic about the river is its long bends—in some instances so excessive that while the distance around is half a mile or more, the distance across is only a few feet. These strips are frequently cut through at freshets; and at some of these strips the river has cut across, so that except at very low stages the water rushes through with considerable velocity, forming what are locally known as "sucks." As these cut-offs reduce the distance considerably, they are used by raftsmen when the suck has been widened and cleared of trees and stumps. They have an injurious effect upon the channel, as the water divides and the depth is lessened. The place known as "The Sands," referred to in t[illegible] paragraph, is caused by a suck just above. When t[illegible]der improvement the policy was to close these sucl[illegible] progressed far, or to open them up and make th[illegible] relying upon the gradual silting up of the old [illegible] success was obtained in opening tha[illegible]

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Another feature of the stream is the outcropping of marl in a number of places, reducing the low-water width to about 30 feet. An old map shows this "rock" as recurring seven times. This marl is fairly hard and would require a strong dipper dredge to remove it. Just above Givhans Ferry the banks are marl, standing perpendicular for 15 or 20 feet. Lower down, near Jacksonboro, it is stated that the marl is of a different kind—hard above water level, but somewhat less difficult to detach under water—and that the depths over it are not more than 30 inches.

The only business done on the river is the lumber business. At the junction there is a sawmill, and between that point and Jacksonboro there were seen four mills on the banks and five landings for mills a short distance away. Sawed lumber is made up into rafts and floated down the river, generally to Charleston. Besides, logs and piles are rafted in the same way. These mills are not large ones and their output is consigned to Charleston dealers, four of whom take almost all the lumber from the Edisto. From information furnished by these four dealers, the following commercial statistics are compiled for the year 1906:

	Quantity.	Value.
	Tons.	
Sawed lumber (38,225,000 feet)	85,175	$345,500
Logs (17,500,000 feet)	70,000	168,000
Piling (135,000 linear feet)	5,000	7,000
Total	160,175	520,500

This business compares favorably with the lumber business on the other large streams in the State under improvement. For 1906 the figures were:

	Timber, lumber, etc.	Value.
	Tons.	
Waccamaw River	200,000	$1,000,000
Great Pedee River	150,600	493,675
Santee River	400,000	560,000

An attempt was also made to find the approximate amount and value of the standing timber near the river that would probably be taken to market on the river. When the last examination was made, in 1902, it was reported that between Jacksonboro and the fork there were probably 200,000,000 feet of pine lumber and 100,000,000 feet of cypress; and on the South Fork, 100,000,000 feet of pine and more than that amount of cypress. Lately large timber interests have been investigating this locality and have made extensive purchases of timber land. From correspondence with them the following information has been obtained: On the South Fork near Springfield there are in a distance of about 25 miles by river about 200,000,000 feet, divided as follows: Cypress, 30 per cent; pine, 50 per cent; hardwood, 20 per cent. This is held by the owners at prices ranging from $1 to $5 per 1,000 feet. Below and extending as far down as Givhans Ferry on the main river there are at least 500,000,000 feet, so that possibly 1,000,000,000 feet would come down from the South Fork and the river below the junction.

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Figuring the tonnage at 6 pounds per foot in the log, it would be 3,000,000 tons and the value at $2 per 1,000 feet would be $2,000,000.

Three large concerns state that their holdings on the main river amount to between 400,000,000 feet and 450,000,000 feet, valued at $800,000 or $900,000.

The rafting is attended with many delays and losses, especially at low stages of the river, caused by the obstructions in the stream. Logs and lumber could be seen hung up on snags or bars; some of it could be removed at higher stages, but others were total losses. One party, the owner of a small mill, stated that during the past year he alone lost $1,000 in this way. On account of the magnitude of the present and prospective business I regard the river as worthy of improvement to the extent of making it a good rafting river. Other forms of commerce might spring up if the river was thoroughly cleared and maintained so. One of the mill owners is now installing a planer and proposes to ship dressed lumber to Charleston in lighters, drifting them downstream. At present there is no need to provide for any other form of navigation than rafting.

No instrumental survey is needed. When the river is at a low stage, a thorough examination should be made to determine the character and number of the obstructions, to decide what sucks should be opened and what should be closed, and to estimate the cost. This examination need not extend above the mouth of Shaws Creek, as the river at Scotts bridge is entirely too small for any improvement. The cost would be $250, and it is respectfully recommended that this sum be allotted.

Very respectfully,

G. P. HOWELL,
Captain, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

OFFICE OF DIVISION ENGINEER, SOUTHEAST DIVISION,
Savannah, Ga., July 22, 1907.

Respectfully submitted to the Chief of Engineers, U. S. Army.

The results of the personal examination made by the district officer are such as to indicate that this river is worthy of the moderate degree of improvement suggested by him, provided the cost bears proper relation to the benefit likely to accrue.

I would therefore respectfully recommend that an allotment of $250 be made to enable the examination to be carried far enough to arrive at the approximate cost of the improvement.

DAN. C. KINGMAN,
Lieut. Col., Corps of Engineers,
Division Engineer, Southeast Division.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., September 3, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

In the within report the district officer gives a brief history of improvements heretofore undertaken by the United States on this stream and a full description of its physical characteristics and of the commerce that may be affected by its improvement.

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In 1903 a preliminary examination was made of "Edisto River from the mouth to the Aiken and Edgefield line." The upper limit of the present examination, Scotts bridge, is about 15 miles below the Aiken-Edgefield line, the limit of the examination in 1903. It would appear, therefore, that the portions of river proposed for improvement in these two examinations are practically identical.

The only commerce carried on the stream is lumber, and the work proposed by the district officer therefore has in view only the facilitation of this traffic. With reference to the advisability of undertaking an improvement designed wholly to expedite the rafting of forest products, the Board, when reviewing the report of the last examination of this river, expressed the following opinion:

> Having in mind that to facilitate the removal of the remaining timber upon the upper Edisto is a matter of at least doubtful public policy; that no improvement of this stream at reasonable cost would be of a permanent nature; that no general navigation is expected to result from any improvements proposed; that the greater portion of the good timber has probably already been removed, and that the lower portion of the river is still useful for logging purposes, the Board is of opinion that it is not advisable for the United States to undertake the further improvement of this river.

Aside from the fact that a slightly larger prospective output of lumber is now estimated than at the time of the former examination, no change in conditions affecting the advisability of the improvement is apparent to the Board. The probability of the growth of a general commerce as a result of providing facilities for the rafting of lumber is, in the opinion of the Board, too remote to be considered a factor in the question of undertaking the improvement now proposed. While the improvement would facilitate the shipment of timber from the river, the Board believes that the benefits thus gained would not be commensurate with the probable cost of the work.

After careful consideration, the Board is unable to concur with the district officer and the division engineer as to the advisability of making a survey with a view to the improvement of the South Fork of Edisto River, and for the reasons stated it is of the opinion that the proposed improvement is not worthy of being undertaken by the United States.

At the request of the Board, interested persons were invited to submit statements and arguments in behalf of the improvement. The one communication received in response to this invitation has been given due consideration.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 530.

LITTLE RIVER, SOUTH CAROLINA.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF LITTLE RIVER, SOUTH CAROLINA, AT ITS MOUTH.

JANUARY 20, 1908.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, January 18, 1908.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated January 17, 1908, together with copy of a report from Capt. Earl I. Brown, Corps of Engineers, dated August 29, 1907, of a preliminary examination of Little River, South Carolina, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

WM. H. TAFT,
Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, January 17, 1908.

SIR: I have the honor to submit herewith for transmission to Congress report of August 29, 1907, by Capt. Earl I. Brown, Corps of Engineers, on preliminary examination authorized by the river and harbor act approved March 2, 1907, of Little River, South Carolina, with a view to removing bar at its mouth.

From the facts and for the reasons given I concur in the opinion of the district officer, the division engineer, and the Board of Engineers for Rivers and Harbors that this locality is not worthy of improvement by the General Government in the manner proposed.

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The item in the act indicated an examination of Little River in the State of North Carolina, but this office was advised informally that the locality intended was the one which has been made the subject of the report herewith.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF LITTLE RIVER, SOUTH CAROLINA, AT ITS MOUTH.

WAR DEPARTMENT,
UNITED STATES ENGINEER OFFICE,
Wilmington, N. C., August 29, 1907.

GENERAL: I have the honor to submit the following report of a preliminary examination of Little River, South Carolina, made pursuant to the following clause of the river and harbor act approved March 2, 1907: "Little River, with a view to removing bar at its mouth."

The duty of making this examination was assigned to the officer in charge of this office, on March 14, 1907.

Little River is a small tidal estuary, heading about 3 miles from the seacoast in South Carolina, thence extending parallel to the coast slightly north of east in direction to a point near the North Carolina State line, then flowing in a direction perpendicular to its original course into the ocean. The distance from the bar to the point where it changes direction is 3¼ miles; from there to the town of Little River, S. C., it is 2½ miles. At the point of change of direction it has a tributary from the northeast—Calabash Creek—a stream whose characteristics are about the same as those of Little River.

The town of Calabash, N. C., is on this creek, about 1½ miles from its mouth. A few yards to the eastward of Little River Inlet is Mad Inlet, the outlet of Mad Inlet Creek and a system of small intercommunicating sounds extending along parallel to the coast to Shallotte Inlet. Little River Inlet and Mad Inlet are separated by Bird Island, in the rear of which a short channel connects Little River and Mad Inlet Creek. The two inlets have a common bar about 100 yards offshore. A depth of 8 to 10 feet is available in Little River from the bar to the town of Little River. The channel across the bar is quite variable. It is reported by the Wilmington, Southport and Little River Transportation Company, which runs a steamer between Wilmington and Little River, that about six weeks ago the depth over the bar was somewhat more than 6 feet at low water. I made a personal examination of the bar on August 23, and found that it had shoaled to about 18 inches at low water. It is stated that this variation of depth is a matter of common occurrence.

It is also changeable in position. In common with most unprotected bars on the South Atlantic coast, its changes go through a regular cycle. It will swing from east to southwest, and then break out anew to the eastward. Changes in both position and depth are subject to the local influences of the winds

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The tidal variation at the inlet is not accurately known. It is probably about 4½ feet, the same as at the mouth of the Cape Fear River, 30 miles distant. The tidal flow into and out of Little River basin is not great enough to maintain a channel across the bar, unless it were confined to very narrow limits.

Dredging for removing the bar seems to be out of the question, without additional works for making the position of the channel stable. This could be accomplished only by one or more jetties, whose construction at this remote place would be very expensive, and not justified by the present commerce passing through the inlet.

The principal interests concerned in the proposed improvement are the Wilmington, Southport and Little River Transportation Company, engaged in a general trade between Wilmington and Little River, the Hammer Lumber Company, operating an extensive lumber plant at Little River, and the Little River Lumber Company of South Carolina, also operating lumber mills there. The Transportation Company last year operated between Wilmington and Little River and Calabash the steamer *Compton* and the barges *Mineola* and *Israel W. Durham.* The steamer *Compton* has since been sold and the steamer *Mayflower* has taken her place. In addition to these, two small schooners make regular trips when the weather permits. The Hammer Lumber Company began operation early in January, 1907. They have a tug of about 5 feet draft, which is to be used for towing barges of lumber from the mills to market. No exact information can be obtained at present as regards the Little River Lumber Company, but it is known that their establishment is not nearly as large as that of the Hammer Company.

The commerce for the year ending December 31, 1906, was as follows:

Commodity.	Tons.	Price.	Value.
Cotton	500	$210	$105,000
Cotton seed	90	25	2,250
Cotton-seed meal	5	25	125
Grain	600	35	21,000
Hay	300	20	6,000
Potatoes	60	20	1,200
Vegetables	75	20	1,500
Cattle	31	60	1,860
Horses	20	100	2,000
Hogs	20	100	2,000
Poultry	40	200	8,000
Eggs	23	300	6,900
Fish	100	60	6,000
Oysters	3	35	105
Clams	240	50	12,000
Rosin	2,816	20	56,320
Turpentine, spirits	98	140	13,720
Lumber	3,000	10	30,000
Fertilizer	800	22	17,600
Machinery	300	100	30,000
General merchandise	1,200	140	168,000
Tar	84	12	1,008
Peanuts	88	60	4,980
Total	10,489	------	497,568

Number of passengers, 2,350.

The opening up of the big plant of the Hammer Lumber Company since January 1, 1907, will cause a large but indeterminate increase in the commerce for this year. Attention is invited to the inclosed letter of the Hammer Lumber Company in this connection.

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Although the commerce through this inlet has probably now reached the half-million mark, I do not believe that the problem of confining and controlling this variable and shifting bar, exposed as it is to the full force of the southeast storms so prevalent on this coast, can be solved by the expenditure of any sum of money that this commerce might justify. I have to report, therefore, that, in my opinion, Little River is not worthy of improvement by the General Government to the extent of removing the bar at its mouth.

Respectfully submitted.

EARL I. BROWN,
Captain, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

OFFICE OF DIVISION ENGINEER, SOUTHEAST DIVISION,
Savannah, Ga., September 3, 1907.

Respectfully forwarded to the Chief of Engineers.

I agree with the district officer in his opinion that the cost of maintaining a stable channel of considerable depth across the bar at the mouth of Little River would be too great to be justified by the present or prospective commerce at this place.

DAN C. KINGMAN,
Lieut. Col., Corps of Engineers,
Division Engineer, Southeast Division.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., October 7, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

Little River is a small tidal estuary near the border line between the States of North Carolina and South Carolina, about 8 miles in length. About 2½ miles from its mouth is its principal tributary, Calabash Creek, on which is located the village of Calabash, with a population of about 80. The village of Little River, situated about 5½ miles from the mouth, with a population of about 150, is the principal settlement on this waterway.

There is an available depth to the village of Little River of 8 to 10 feet with the exception of the ocean bar, where the depth is quite variable, reports indicating changes of from 18 inches to 6 feet. The position of the channel over the bar is as changeable as its depth, an examination of the chart indicating a probable swing in position of as much as 1½ miles. About one-half mile or less to the north of Little River Inlet is Mad Inlet, with which it is connected at the bar, as well as by a channel back of Bird Island. The question involved in the present consideration is the removal of the bar at the mouth of the river.

This locality is exposed to the full force of the south and southeast winds, and the position and depth of the channel are likely to change with each succeeding storm. Channels carrying 6 feet in depth are reported to have filled in a short time to 18 inches. It is not prob-

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able that a dredged channel through the bar would maintain itself any better than one which has formed naturally, and these are known to have no degree of permanence. The only practicable way of maintaining a reliable channel through the inlet is by the use of jetties, and it is not improbable even with these that during some violent storm the channel might leave its proper course and seek a new outlet.

The commerce involved is reported to be about 10,500 tons of a miscellaneous character, the principal item being timber and its products. There being no manufactories or commercial industries in the tributary country, it is not likely there will be any material growth in population or in commerce, except perhaps a temporary increase due to the establishment of new mills for the purpose of working some tract of timber.

It was stated to the Board by an interested party that an improvement of a temporary nature by dredging would be greatly appreciated and would be of considerable value. In the opinion of the Board, however, such a channel would be no better and no more permanent than that provided by nature from time to time, and therefore it would not be advisable to undertake such a work. The only practicable means of improving the mouth is by the construction of jetties and auxiliary works, the cost of which would be out of all reasonable proportion to the benefits to existing and reasonably prospective commerce. The Board therefore concurs with the district officer and the division engineer in believing the improvement of the locality by the General Government inadvisable.

Several communications from interested parties bearing upon the subject of this improvement were received by the Board and duly considered.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

LETTER OF THE HAMMER LUMBER COMPANY.

WILMINGTON, N. C., *July 17, 1907.*

SIR: In reply to your communication asking statistics of the wealth and commerce of and tributary to Little River Inlet, South Carolina, I would state as follows:

There are two lumber companies established there, the Hammer Lumber Company, of North Carolina, with a capitalization of $168,500, and the Little River Lumber Company, of South Carolina. For statistics of latter's capital and property I refer you to same, but believe them to have $30,000 capital and property valued at $45,000.

The Hammer Lumber Company has property there valued at $175,000, and has dependent on its operation 125 hands, supporting a population estimated at 300 to 400 souls.

The output of Hammer Lumber Company is annually as follows: Exports (domestic), 12,000,000 feet lumber, valued at mill at $200,000; imports, supplies and commissary goods, valued at $25,000.

I should say that the Little River Lumber Company has an annual export of 7,500,000 feet lumber, valued at mill at $125,000; imports, supplies valued at $10,000.

There is practically dependent on the condition of this inlet as a navigable gateway an area of 150,000 acres, with a population of certainly 2,500, and I

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should estimate the commerce that would use this gateway, exclusive of the commerce of the mills, at, roughly, per annum:

Imports, groceries, and necessities, guanos, machinery, etc	$150,000
Exports, farm and fish products	200,000

A summary of commerce that such a deepening of inlet bar would produce would be, per annum:

Imports:	
Lumber	$325,000
Farm and fisheries products	200,000
	525,000
Imports:	
Lumber company supplies	$35,000
Farm and household supplies, principally foods	150,000
	185,000
Total commerce, imports and exports	$710,000

Upon the deepening of this bar depends the existence of two big lumber companies, with a capitalization of over $200,000, a score of county stores, and the food and farm fertilizers for hundreds of farmers.

The belt contiguous to Little River is extremely fertile, and the shallowing of the bar has worked great hardship, it being almost impossible for the inhabitants to secure food and necessaries and quite impracticable to ship their products. Already many thousands of dollars worth of marine property have been lost because of this shallow bar and it will continue a menace until deepened.

The plant of the Hammer Lumber Company is running half time, and it is even now carrying $50,000 worth of lumber on its yard, which it has been unable to move. The Litle River Lumber Company is about to shut down completely.

We trust that these statistics will help you and us.

We have January 1 to July 1, 1907, only shipped 500,000 feet of lumber, where we should have shipped 6,000,000 feet—all due to conditions of this inlet.

Yours, truly,

T. P. HAMMER, *Secretary.*

Mr. MERRITT,
Engineer's Office, City.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 531.

PATUXENT RIVER, MARYLAND.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF PATUXENT RIVER, MARYLAND.

JANUARY 20, 1908.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, January 18, 1908.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, United States Army, dated January 17, 1908, together with copy of a report from Maj. Spencer Cosby, Corps of Engineers, dated July 15, 1907, of a preliminary examination of Patuxent River, Maryland, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

WM. H. TAFT,
Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, January 17, 1908.

SIR: I have the honor to submit herewith for transmission to Congress, report of July 15, 1907, by Maj. Spencer Cosby, Corps of Engineers, on preliminary examination of Patuxent River, Maryland, authorized by the river and harbor act of March 2, 1907.

A certain amount of dredging has been done on Patuxent River, but, from the facts and for the reasons given in the accompanying report, I concur in the opinion of the district officer, the division

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engineer, and the Board of Engineers for Rivers and Harbors that the river is not worthy of further improvement by the General Government at this time.

Very respectfully, A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF PATUXENT RIVER, MARYLAND.

UNITED STATES ENGINEER OFFICE,
Washington, D. C., July 15, 1907.

GENERAL: In accordance with instructions from the Chief of Engineers, I have the honor to submit the following report of a preliminary examination of the Patuxent River, Maryland, made in compliance with the requirements of the river and harbor act of March 2, 1907.

The examination was made April 16, 1907, by Asst. Engineer F. C. Warman. A hearing held by him at Bristol was announced by means of notices posted in prominent places and by letters to interested parties; twenty-two persons were present at the hearing and manifested great interest in the improvement of the river.

GENERAL DESCRIPTION OF LOCALITY.

The Patuxent River rises about 35 miles north of Washington, D. C., near the point of intersection of the boundary lines of Frederick, Howard, and Montgomery counties, Md. It flows in a general southeasterly direction for a distance of about 110 miles and empties into the western side of Chesapeake Bay some 20 miles above the mouth of the Potomac, forming the boundary line of seven counties.

The tide rises in the river for a distance of 60 miles or more above its mouth, and below Holland's wharf (28 miles above the mouth) the river is practically a tidal estuary of Chesapeake Bay.

The range of tides is generally between 1.6 and 2.3 feet.

The width of the river at Bristol Landing, 46 miles above the mouth, is about 400 feet; it gradually increases to about 2,000 feet at Holland's wharf, between which point and the mouth the river widens to about 2 miles, suddenly contracting to about 1 mile at its mouth at Drum Point.

The tidal portion of the stream as far down as Holland's wharf is bordered with marshes, generally submerged at high tide.

The river is navigable for vessels drawing 12 feet or more as far as Holland's wharf, and the first reported obstruction to the 10-foot navigation now desired is at Swan Point bar, 43 miles above the mouth. The drawbridge of the Chesapeake Beach Railroad crosses the river about 45 miles above its mouth. Bristol Landing, 1 mile above the bridge, is the present head of navigation by steamers and vessels drawing over 6 feet. Prior to 1885 steamers ascended to Hills Landing, 1½ miles above Bristol, but this wharf has been abandoned for several years owing to the shoaling of the channel. A short distance above Hills Landing there are visible at extreme low tide the hulks of some old vessels reported to have been sunk by the British during their attack upon Washington in the war of 1812.

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There are several regular landings on Patuxent River, all of which except Bristol Landing are located below Swan Point bar, and hence require no improvement to render them accessible. The examination was therefore limited to the 3 miles of river immediately below Bristol Landing and the adjacent country.

Residents of the western shore of this portion of the river have abandoned their wharves and evidently prefer to ship their goods by the railroad which is less than 2 miles from the river.

There is a settlement of 200 or 300 persons centering around Bristol Landing on the east bank, at which place there are two wharves, the upper belonging to Anne Arundel County and the lower to the Maryland, Delaware and Virginia Railway Company, which operates the steamer line. This landing, as the head of navigation on Patuxent River, is the outlet for the produce of a fairly large section of country, and is said to be, next to Lower Marlboro, the most important shipping point on the river. The distance from Bristol Landing to Fairhaven and West River, the nearest landings on Chesapeake Bay, is from 10 to 12 miles; persons residing within 5 miles of Bristol Landing prefer to ship at that point, while those living as far as 8 miles up the Patuxent also use this wharf.

The estimated population of this tributary area is 1,000, of whom 120 are shippers and the others dependents. There are about half a dozen general merchandise stores located in this area which receive their supplies from Bristol Landing. It is stated that the number of landholders is somewhat increasing, whereas labor is scarce and decreasing.

The nearest landing on Patuxent River below Bristol is Lyons Creek wharf, which is about 5 miles distant by river and 6½ miles by road; owing to the marsh, no landing between the two is said to be practicable on the east side of the river.

The Chesapeake Beach Railroad, which was completed about 1900, has a station at Pindell about 2 miles from Bristol Landing. The roads leading to this station are reported to be in poor condition, and, as this railroad has no direct connection with Washington or Baltimore, freight has to be shipped on two lines and the freight rates are consequently high.

The distance from Bristol to the nearest Pennsylvania Railroad station at Upper Marlboro is about 5 miles over a fair road.

Farming is the principal industry; the soil is considered to be fairly good and land values range from $40 to $60 per acre. A canning factory was at one time in operation at Bristol Landing, but failed fifteen or sixteen years ago and has never resumed operations.

PREVIOUS EXAMINATIONS, SURVEYS AND OPERATIONS.

A preliminary examination of Patuxent River below Hills Landing was made in 1886 and a favorable report submitted. A survey of Bristol bar and Swan Point bar, at that time the only important obstructions to navigation below Bristol, was made in the latter part of 1887. The ruling depth was found to be about 7.6 feet at Bristol bar and 7.8 feet at Swan Point bar. The report on this survey contained a project for dredging channels 12 to 13 feet deep at low tide and 200 feet wide through these bars with a turning basin

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of the same depth and 300 feet wide at Bristol Landing, at an estimated cost of $80,000.

The sum of $5,000, appropriated by the river and harbor act of August 11, 1888, was expended at Bristol bar in dredging a channel 12 feet deep and 120 feet wide extending from the 12-foot contour at the lower end of the bar to a point about 250 feet above the steamboat wharf. Six thousand dollars was appropriated by the act of September 19, 1890, and was applied to dredging a channel 9 feet deep and 132 feet wide at Swan Point bar, which was completed in June, 1891. These channels were considered at the time to afford ample facilities for the commerce, present and prospective, and further appropriations were not recommended.

The river and harbor act of March 3, 1899, provided for a preliminary examination of "Patuxent River at Bristol bar;" this was made in May, 1899, and the locality was reported worthy of improvement. A survey of Bristol bar was made in October, 1899, and showed that considerable shoaling had taken place in the previously dredged channel, the ruling depth being then only about 7.5 feet.

Congress, by act of June 13, 1902, appropriated $9,000 for improving Breton Bay and Patuxent River, and adopted a project for improving the latter by dredging a turning basin 400 feet long, 300 feet wide, and 10 feet deep at Bristol Landing, and a channel 100 feet wide and 10 feet deep from this basin to the 10-foot contour at the lower end of Bristol bar. Three thousand dollars was allotted to the work at Patuxent River, but before any work was done, the advisability of continuing the improvement or modifying the project was investigated by the Board of Engineers for Rivers and Harbors, in compliance with a resolution of the Committee on Rivers and Harbors of the House of Representatives. After full consideration of all obtainable data and holding a hearing at which practically no interest was shown in the matter by residents of the locality, a report adverse to the continuance of the improvement was submitted by the Board September 11, 1903.

The allotment of $3,000 from the act of June 13, 1902, was, however, expended in June and July, 1904, in dredging at Bristol bar. As a result of this expenditure there was obtained a channel 100 feet wide and 10 feet deep and a turning basin about 240 feet wide, 350 feet long, and 10 feet deep.

The following is quoted from Mr. Warman's report:

OBSTRUCTIONS TO NAVIGATION.

At the time of the present examination the following obstructions to navigation were noted:

1. Bristol bar, which has shoaled up since the completion of work in 1904 to a depth of 6½ to 8½ feet in the channel and turning basin. The length of this bar is about 1,000 feet and it is composed of soft mud.

2. A mud bar recently formed at the first turn below Bristol Landing. The channel depth is sufficient, but the channel is narrow and crooked and should be widened and straightened.

3. A similar mud bar on the right-hand side of the river immediately above the Chesapeake Beach Railway bridge renders navigation through the draw difficult, if not dangerous.

4. Swan Point bar, which has shoaled up since the completion of work in 1891 to a depth of 7 to 8 feet. This bar is nearly a mile in length and is composed of mud.

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IMPROVEMENT DESIRED.

The improvement requested is the dredging of a channel 100 feet wide and 10 feet deep through all the shoals below Bristol Landing, with a turning basin of the same depth 400 feet long and 300 feet wide at Bristol.

It is to be anticipated that these channels would require repeated redredging to maintain them in navigable condition.

PRESENT COMMERCE.

The commerce of Patuxent River in the aggregate is considerable, but that at Bristol Landing is comparatively small. It consists chiefly of tobacco, grain, general merchandise, live stock, and farm produce, and amounts to about 1,000 tons per annum (estimated value $125,000). The number of passengers carried during 1906 was 143. Shipments are made almost exclusively to and from Baltimore on the steamers of the Maryland, Delaware and Virginia Railway Company. These steamers draw about 8½ feet when fully loaded and the draft at Bristol Landing is rarely over 8 feet. They endeavor to maintain a schedule of two boats a week, except from January to March, when but one trip is provided for, and from August to September, when three trips a week are made. Owing to low tides, ice, and fogs, these trips are somewhat irregular and 6 trips were missed between January 18 and March 3, 1907, for these reasons. A delay at Bristol Landing affects the schedule on the entire river, and uncertainties of delivery have recently compelled merchants and others to ship perishable articles by rail at much higher rates or to haul long distances to wharves on Chesapeake Bay.

The steamers are scheduled to arrive at Bristol Landing at too early an hour to accommodate many of the shippers, and the company promises no relief in this respect, as this is independent of the improvement.

There are occasional shipments of grain and similar articles by sailing vessels landing at the county wharf, but for the last two or three years there have not been over 10 such vessels per year landing at the wharf.

Some years ago the steamboat company operated a number of scows on the 10 miles of river between Bristol Landing and Clagetts Landing, 10 miles above, and scowed down considerable freight in this manner. This service, however, has been discontinued and it is understood that it will not be resumed. The shippers from this part of the country now haul their freight over the roads to Bristol Landing or to Marlboro.

At the present time about nine-tenths of the produce from the area properly tributary to Bristol Landing is shipped by water and about one-tenth by rail; and these rail shipments are said to be largely due to failure of the steamer to maintain its schedule.

The following tabulation shows the comparative freight rates on some articles frequently shipped:

	Rail rate.	Water rate.
Barrel of bacon	$0.32	$0.25
Tub of lard	.15	.15
1 barrel of sugar	.54	.25
1 barrel of molasses	1.01	.45
100 pounds coffee	.26	.25
1 barrel fish	.42	.25
1 case shoes	.26	.25
1 barrel oil	.76	.40
1 barrel flour	.26	.25
5 barrels flour ..... each	.26	.20
25 barrels flour ..... do	.26	.15
1 bag salt	.26	.25
10 bags salt ..... each	.26	.12½
1 barrel lime	.26	.25
6 barrels lime ..... each	.26	.15

PROSPECTIVE COMMERCE AND BENEFITS.

It is anticipated that the channel improvement might result in a s[illegible] crease in water shipments from Bristol bar, which would result [illegible] diversion of traffic from the railroads and from long hauls to the mo[illegible] service now provided at the wharves on Chesapeake Bay.

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The request for the improvement is, however, based chiefly upon the desire to maintain the traffic which has been built up in this locality in the past.

Mr. Willard Thomson, general manager of the Maryland, Delaware and Virginia Railway Company, states that the farming interests in this section would be reduced in value fully 50 per cent if they were deprived of the present water transportation facilities. He sent a special representative of the company to be present at the hearing and has otherwise evinced considerable interest in this improvement. The residents of the locality have been aroused from the indifference which existed at the time the examination was made by the Board of Engineers for Rivers and Harbors, through the failure of the boats to maintain their schedules, and are now exceedingly anxious that the work be done.

No reduction in water freight rates is anticipated.

CONCLUSIONS.

While the improvement of this stream between Swan Point bar and Bristol Landing would unquestionably be of benefit to the residents of the locality and to the steamboat company, the interests involved are so small and so purely local in character that the improvement can hardly be considered of sufficient general importance to warrant the comparatively large expense involved in dredging and continuously maintaining a channel to provide access to this single landing. The cost of maintaining a channel above Lyons Creek wharf will unquestionably be large, as it is anticipated that the shoaling, especially that above the railroad bridge, will continue at a rapid rate.

The trade seems to have fallen off somewhat, probably owing to the irregularity of the steamer schedule, since the examination resulting in an unfavorable report made by the Board of Engineers for Rivers and Harbors. Although the Board was given to understand that no improvement was required except at Bristol bar, the amount of work now needed to make Bristol Landing accessible is much greater than was contemplated by the Board.

The residents of the locality are now provided with railroad facilities which did not exist when the previous examinations were made which resulted in favorable reports. While these facilities are perhaps not all that might be desired, they are superior to those possessed by many other communities of equal and greater importance in neighboring parts of Maryland and Virginia.

It will be possible, when the shoaling has made navigation by large steamers impracticable, to abandon Bristol Landing as a wharf on the schedule of the regular line steamers and make Lyons Creek wharf the head of navigation for such boats. A light-draft steam or gasoline lighter could easily and economically be operated from this point to Bristol, Hills, and other landings above. The schedule could also be arranged to accommodate shippers even better than at present.

In view of these facts I am of the opinion that Patuxent River, Maryland, is not worthy of further improvement by the General Government.

The estimated cost of a survey, should one be desired, is $300.

Very respectfully,

SPENCER COSBY,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

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[Second indorsement.]

U. S. ENGINEER OFFICE, EASTERN DIVISION,
New York City, July 25, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army.

In view of the facts in connection with this stream and its commerce, present and prospective, as presented by the district officer, I fully agree with him in his conclusion that the Patuxent River is not worthy of further improvement by the General Government.

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Division Engineer.

[Fourth indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., August 12, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

Consideration has been given to the within report on the subject of a preliminary examination of Patuxent River, and to all other available data, including several communications from interested persons. The present condition of the stream, the character and extent of the commerce carried upon it, previous examinations made, and improvements undertaken are quite fully described within.

The present head of practical navigation is at Bristol Landing, 46 miles above the mouth of the river. The improvement desired is stated to be a channel 10 feet in depth to the wharf at this point, with a suitable turning basin. A depth of 10 feet or more now exists as far up as Swan Point bar, 43 miles above the mouth, so that the improvement desired is over a stretch of about 3 miles below Bristol Landing.

The number of persons who reside in the section of country tributary to Bristol Landing, and who may be considered as representing the interests to be affected by the desired improvement, is reported to be about 1,000, most of whom are engaged in farming. The commerce of the Patuxent River is in the aggregate considerable, but that pertaining to Bristol Landing is only about 1,000 tons, valued at $125,000. As this commerce consists of the products of the locality and the supplies necessary for the maintenance of a very settled community, it is not reasonable to anticipate any considerable increase.

Experience indicates that the channel and basin if provided would require periodical redredging at considerable expense in addition to the first cost of the improvement.

In view of the small and local commerce involved, the improbability of any material increase, and the large relative cost of the improvement when compared with expected benefits, the Board has arrived at the conclusion, concurring with the district officer and the division engineer, that at this time the improvement of Patuxent River is unworthy of being undertaken by the United States.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 532.

WEKIVA RIVER, FLORIDA.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF WEKIVA RIVER, FLORIDA.

JANUARY 20, 1908.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, January 18, 1908.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated January 17, 1908, together with copy of a report from Maj. Francis R. Shunk, Corps of Engineers, dated June 6, 1907, of a preliminary examination of Wekiva River, Florida, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

WM. H. TAFT,
Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, January 17, 1908.

SIR: I have the honor to submit herewith, for transmission to Congress, report of June 6, 1907, by Maj. Francis R. Shunk, Corps of Engineers, on preliminary examination of Wekiwa (Wekiva) River, Florida, authorized by the river and harbor act of March 2, 1907.

From the facts and for the reasons given I concur in the opinion of the district officer, the division engineer, and the Board of Engi-

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neers for Rivers and Harbors that this locality is not worthy of improvement by the United States.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF WEKIVA RIVER, FLORIDA.

UNITED STATES ENGINEER OFFICE,
Jacksonville, Fla., June 6, 1907.

GENERAL: In compliance with Department letter of March 14, 1907, I have the honor to submit the following report on preliminary examination of Wekiva River, Florida, authorized by the river and harbor act of March 2, 1907. Examination was made March 18, 19, and 23, 1907, by Mr. F. W. Bruce, assistant engineer.

The name Wekiva is shared by two confluent streams—Wekiva River and Wekiva Spring Run. Above its junction with the run the river is an insignificant stream; the run is really the main branch. Examination was therefore made of the river to its junction with the run, and thence of the run to its source.

The source of the run is Wekiva Spring, where a large volume of water issues from the ground, forming a pool from which flows a considerable stream averaging 100 feet in width and about 3 feet in depth. The place is a pleasure resort. From Wekiva Spring to its junction with the St. Johns River the stream is about 15 miles long. For most of the distance the banks are low and swampy; much of the water flows into side channels and is lost in the swamps. There is plenty of water in the river to afford good navigation if it could be confined to a single channel of reasonable width. Its course is obstructed by snags, bends, etc., so that it is with difficulty that a rowboat can get through at low stages of the water. The high land in the vicinity of the river does not appear to be very fertile, although there are several orange groves in the district. A flat-bottom stern-wheel launch, the *Elinor*, runs on the river at certain seasons. Her draft is not more than 18 inches and nothing of greater depth could get through at favorable stages, although in many places the channel is 8 or 9 feet deep. In addition to its other difficulties the stream is badly choked with water hyacinths.

There is no commerce on this river. In the winter season the launch referred to is used for pleasure purposes by visitors to the spring. There are two turpentine stills about 10 miles above the mouth which would probably ship their products by the river if there were a navigable channel. Such channel would also probably be used for the transportation of lumber, as there are valuable timber and turpentine forests adjacent to the stream. The country is not thickly settled.

In order to make a practicable channel in the Wekiva River it would be necessary to do a great deal of snagging and dredging, and dams and training walls might also be required to confine the channel.

It has been impossible to obtain commercial or industrial statistics. As before remarked, there is no commerce on the river. The commerce of the surrounding country is by railroad. Nothing definite as to quantities can be ascertained, but the total amount is small.

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It is not my opinion that the benefit to commerce which would result from improvement of the Wekiva River would be commensurate with the probable cost of improvement, and I therefore think that the river is not worthy of improvement by the United States. Persons interested in the improvement have been interviewed.

Very respectfully, your obedient servant,

FRANCIS R. SHUNK,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

OFFICE OF DIVISION ENGINEER, SOUTHEAST DIVISION,
Savannah, Ga., June 7, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army.

I am of the opinion that such a river is not worthy of improvement at this time.

DAN C. KINGMAN,
Lieut. Col., Corps of Engineers,
Division Engineer, Southeast Division.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., July 1, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

The Wekiva is a small stream rising at Wekiva Spring and flowing generally northward for a distance of 15 miles to the St. Johns River. For most of the distance its banks are low and swampy and its course is much obstructed by bends, snags, and hyacinths. At present it carries no commerce, and from the character of the stream and adjacent country it is improbable that its improvement would result in developing a commerce at all commensurate with the cost of the work.

In view of the facts developed by this preliminary examination, as given within, the Board concurs with the district officer and division engineer in the opinion that it is not advisable for the United States to undertake the improvement of this stream. No communications have been received from interested persons who were invited by the district officer to submit to the Board statements and arguments in regard to the commercial necessity for the improvement.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 533.

ARTHUR KILL, NEW JERSEY.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF ARTHUR KILL AT THE WESTERLY SIDE OF BUCKWHEAT ISLAND, NEW JERSEY.

JANUARY 20, 1908.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, January 18, 1908.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated January 17, 1908, together with copy of a report from Col. D. W. Lockwood, Corps of Engineers, dated July 18, 1907, of a preliminary examination of Arthur Kill, westerly side of Buckwheat Island, New Jersey, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

WM. H. TAFT,
Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, January 17, 1908.

SIR: I have the honor to submit herewith, for transmission to Congress, report of July 18, 1907, by Col. D. W. Lockwood, Corps of Engineers, on preliminary examination authorized by the river and harbor act approved March 2, 1907, of Arthur Kill, westerly side of Buckwheat Island, New Jersey, with a view to deepening the channel.

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From the facts and for the reasons given I concur in the opinion of the district officer and the Board of Engineers for Rivers and Harbors that this locality is not worthy of improvement by the United States at the present time.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF ARTHUR KILL AT THE WESTERLY SIDE OF BUCKWHEAT ISLAND, NEW JERSEY.

UNITED STATES ENGINEER OFFICE,
New York City, July 18, 1907.

GENERAL: I have the honor to submit the following report upon a preliminary examination of "Arthur Kill," westerly side of Buckwheat Island, with a view to deepening the channel," made in compliance with Department letter dated March 14, 1907, and pursuant to the river and harbor act approved March 2, 1907.

The Arthur Kill, also called Staten Island Sound, extends from the city of Elizabethport, at the lower end of Newark Bay, to the city of Perth Amboy, at the head of Raritan Bay, a distance of 12 miles; this, together with the lower part of Newark Bay, 2 miles in length, and the Kill van Kull, 3 miles in length, forms an inland waterway 17 miles long, which separates Staten Island from New Jersey, and connects the upper New York Bay with the Raritan Bay and Lower Bay of New York Harbor. The general width of this waterway is from one-eighth to one-fourth of a mile, but it is contracted in several places to widths of from 400 to 600 feet.

Buckwheat Island lies in the middle of this waterway at a point about 2 miles below the north end of Arthur Kill, and about 1 mile below the lower part of the city of Elizabethport. This island is about 500 feet long and 200 feet wide. At this point the waterway is bordered by marsh lands, which have at present little commercial value, but are rapidly building up.

The Arthur Kill is about a thousand feet wide at a point one-fourth of a mile above Buckwheat Island, and in passing Buckwheat Island it widens out toward the west to about 1,400 feet, and diminishes to 1,000 feet in width one-fourth of a mile below the island. The waterway is about 600 feet in width on either side of the island. The natural channel, having a depth of over 20 feet at mean low water, passes on the east side of Buckwheat Island, in nearly a straight course; on the west side of the island the depth is from 4 to 6 feet at mean low water.

A small tributary named Piles Creek enters the Arthur Kill from the west, opposite Buckwheat Island. This is more fully described in the report of the preliminary examination dated January 9, 1906, of the westerly side of Arthur Kill, New York and New Jersey, from a point opposite the north end of Pralls Island to about 2,000 feet north of Piles Creek, and Piles Creek up to Long Branch Railroad, made in pursuance of the requirements of the river and harbor act approved March 3, 1905. This report is printed in House Document No. 541, Fifty-ninth Congress, first session.

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of the opinion that any project for
r the entire length of the stream.
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r Kill at this locality should be de-
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rests.

H. F. HODGES,
t. Col., Corps of Engineers,
Senior Member Present.

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which is practically a local enlargement of the existing project. Probably a general widening of the present project will be found advantageous upon completion of the width of 300 feet proposed under existing project. That, however, is a matter for future consideration; at present I do not consider the locality worthy of improvement by the United States, and therefore do not recommend that a survey be made.

Very respectfully, your obedient servant,

D. W. LOCKWOOD,
Colonel, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.

[Second indorsement.]

BOARD OF RIVERS AND HARBORS,
Washington, D. C., September 9, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

The present project for the improvement of Arthur Kill, adopted by the river and harbor act of June 13, 1902, provides for obtaining a channel 300 feet wide and 21 feet deep at mean low water from Kill van Kull to Raritan Bay. Buckwheat Island is situated about 2 miles below the north end of Arthur Kill, and is in the middle of the waterway, dividing it into two courses of about equal width. The approved channel follows the eastern course in a straight line where a natural depth of more than 20 feet is available, and but little work will be required to attain the full projected dimensions. Between Buckwheat Island and the western shore is a shoal area having depths of from 4 to 6 feet at mean low water. The dredging of a channel through this area is now desired. Such a channel would be crooked and longer than the route now adopted, and would require much more dredging.

The district officer states that a scheme of land development is in progress along the western shore of Arthur Kill, and the enhancement of land values seems to be the principal object in view by parties interested in this proposed improvement. Communications received by the Board from advocates of the improvement substantiate this statement, and there appears to be no present necessity for any additional work in the interests of commerce and navigation at this locality. The provision of a channel on the western side of Buckwheat Island for the purpose particularly sought by the interests represented does not commend itself to the Board as a work worthy to be undertaken by the United States.

The question of providing a channel on the westerly side of Buckwheat Island was given consideration in connection with a preliminary examination of "Arthur Kill, on westerly side, from a point opposite the north end of Pralls Island to about 2,000 feet north of Piles Creek, and Piles Creek up to Long Branch Railroad," made pursuant to the requirements of the river and harbor act of March 3, 1905. In reviewing the report of the district officer on that examination the Board made the following statement:

The Commerce developing in Arthur Kill will soon require a waterway of greater width than that adopted in the existing project, and while the widening of the channel at any locality will afford some relief from present conditions, the Board considers the through commerce of Arthur Kill too important to be

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trammeled by local considerations and is of the opinion that any project for the enlargement of its channel should cover the entire length of the stream.

The Board therefore expresses the opinion that * * * consideration of the improvement of the west side of Arthur Kill at this locality should be deferred until the needs of commerce require that the entire channel of Arthur Kill be enlarged.

After considering the data before it, and hearing the arguments advanced by a representative of the parties interested in the proposed improvement, the Board finds that the situation in regard to through commerce has not changed sufficiently to warrant a departure from the views quoted above, and concurs with the district officer in the opinion that it is not advisable for the United States to undertake at the present time the improvement specified in the act.

In view of the unfavorable opinion held as to the advisability of the improvement, the Board finds no warrant of law for ordering a survey as requested by the local interests.

For the Board:

H. F. HODGES,
Lieut. Col., Corps of Engineers,
Senior Member Present.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 556.

DRY STRAITS, ALASKA.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF DRY STRAITS, ALASKA.

JANUARY 23, 1908.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, January 22, 1908.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated January 21, 1908, together with copy of a report from Capt. G. B. Pillsbury, Corps of Engineers, dated June 3, 1907, of a preliminary examination of Dry Straits, Alaska, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

WM. H. TAFT,
Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, January 21, 1908.

SIR: I have the honor to submit herewith for transmission to Congress report of June 3, 1907, by Capt. G. B. Pillsbury, Corps of Engineers, on preliminary examination authorized by the river and harbor act approved March 2, 1907, of Dry Straits, Alaska, with a view to securing an alternative channel to Wrangell Narrows.

From the facts and for the reasons given I concur in the opinion of the district officer and the Board of Engineers for Rivers and Harbors that this locality is not worthy of improvement by the General Government.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

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PRELIMINARY EXAMINATION OF DRY STRAITS, ALASKA, WITH A VIEW TO SECURING AN ALTERNATIVE CHANNEL TO WRANGELL NARROWS.

UNITED STATES ENGINEER OFFICE,
Skagway, Alaska, June 3, 1907.

GENERAL: I have the honor to submit the following report of the preliminary examination of Dry Straits, Alaska, with a view to securing an alternative channel to Wrangell Narrows, as provided in the river and harbor act of March 2, 1907.

Wrangell Narrows is the most difficult portion of the inside passage to southeastern Alaska. It is the only portion where vessels are delayed on account of insufficient depth of water at low tides. An examination and survey of Wrangell Narrows were made in 1902 and 1903, and the reports thereon are printed in House Document No. 39, Fifty-eighth Congress, second session, and in the Report of the Chief of Engineers for 1904, pages 3656 and 3661.

Dry Straits is about 15 miles to the east of Wrangell Narrows, between Mitkof Island and the mainland. Dry Straits and Wrangell Narrows are shown on chart No. 8200 of the Coast and Geodetic Survey.

Dry Straits is not now navigable except by small craft at high water, the channel being filled with the alluvial deposit from the Stikine River, a considerable stream entering at about the middle of the straits.

The Stikine has several mouths through the tide flat formed by its deposit, the one now carrying the greater part of the flow being the south mouth, which does not discharge into the straits proper.

Channels run up into the tide flats along the steep rock shores on the east of Mitkof Island. These channels carry from 10 to 25 feet of water. They terminate about the middle of the straits in a summit about a mile in length, having the general elevation of the mean lower low waters. The channels were undoubtedly formed by the scour of the ebb tide setting from the flats.

The material of which the flats are composed is stiff blue clay and fine sand. It is improbable that any ledge runs across the flats under the sand, but it is possible that submerged peaks of rock may be found in it. It is stated by old residents of Wrangell that no change has been observed in the configuration of the tide flats in the last twenty years.

The time of high and low water at Ideal Cove, on the north side of the straits, and at Wrangell, on the south side, as given in the tide tables, is practically identical. The tide does not set through the straits, but floods and ebbs from both ends at once, the tides meeting at the summit. The range of the tide is from 9 to 17 feet.

The commerce of the inside passage is somewhat difficult to ascertain on account of the various destinations of the freight passing through it. It has been necessary to estimate certain of the items, but it is believed that these estimates are conservative.

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The commercial statistics for the calendar year 1907 are as follows:

Value of domestic merchandise shipped to southeastern Alaskan ports north of Dry Straits and Wrangell Narrows:	
Coal	$102,195
Lumber	52,981
Hardware	582,254
Provisions	909,372
Liquors	130,420
Miscellaneous	1,201,549
	$2,978,771
Value of foreign merchandise shipped to southeastern Alaskan ports north of Dry Straits and Wrangell Narrows (estimated)	150,000
Value of foreign and domestic merchandise shipped to southern and southwestern Alaskan ports via inside passage—10,319 tons, estimated at	1,500,000
Value of domestic and foreign merchandise shipped to interior points of Alaska and the Yukon territory via the inside passage (estimated)	6,000,000
	10,628,771
The value of gold dust and bullion, foreign and domestic, exported via the inside passage can not be less than	15,000,000

The value of fish and fur exported via the inside passage is not known.

List of vessels under United States register plying to southeastern Alaska during the calendar year of 1907, which would be affected by the improvement of the Dry Straits or Wrangell Narrows.

Name.	Number of trips.	Length.	Draft.	Gross tonnage.
		Ft. in.	Ft. in.	
Alki	13	202 0	18 0	1,259
City of Seattle	21	244 6	14 6	1,411
City of Topeka	3	198 0	17 0	1,057
Spokane	5	270 1	16 0	2,036
Humboldt	27	213 1	14 6	1,075
Cottage City	22	233 1	16 6	1,885
Senator	1	280 0	21 0	2,409
Santa Cruz	3	133 0	14 3	511
Portland	9	200 0	19 6	.....
Bertha	8	180 0	17 6	.....
Jeannie	3	230 0	20 0	.....
Jefferson	26	220 0	17 6	.....
Dolphin	27	213 0	13 0	.....
Farralon	21	158 0	17 0	.....
Dirigo	16	165 0	17 0	.....

The relative advantages of improving Dry Straits and Wrangell Narrows, on the basis of the improvement proposed for Wrangell Narrows in the report above referred to, namely, a 20-foot channel 200 feet wide, are believed to be as follows:

It is possible that a survey might show that the initial cost of improving Dry Straits would be less than that of improving Wrangell Narrows.

The cost of maintenance of the channel in Dry Straits would undoubtedly be largely in excess of the cost of maintenance of the channel in Wrangell Narrows. It is believed that in the case of Dry Straits a dredge would have to be operated for a considerable period every season, while in the case of Wrangell Narrows it is thought that redredging, if required at all, would be necessary only at long intervals.

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The cost of any future enlargement of the proposed channel in Dry Straits would undoubtedly be less than the cost of such enlargement of the channel in Wrangell Narrows. There will be little demand, it is believed, however, for a large channel. The only vessels using the proposed channels will be those plying on the inside passage to southeastern Alaska, and there are several places in this passage that are so narrow and difficult, especially Seymour Narrows in Canadian waters, that it is not thought that large vessels will be extensively used.

In the case of Dry Straits a large proportion of the necessary funds would have to be expended before any benefit would result. In the case of Wrangell Narrows a small proportion of the estimated amount would greatly benefit the channel.

The distance via Dry Straits, along the route of approach now usually taken by vessels, would be about 10 miles shorter than the present route through Wrangell Narrows.

The channel through Wrangell Narrows is lined in many places with rock ledges. Fairly strong currents are experienced. The channel through Dry Straits would be in sand and mud. Fairly strong currents are, however, to be expected, although these would not probably be as strong as in Wrangell Narrows. Very severe winds across the channel frequently blow out of the valley of the Stikine River. Owing to the shoal water and short reach no difficulty from swells is to be expected, but these winds might render the navigation of a narrow channel difficult.

Just north of the north entrance to Dry Straits the Leconte Glacier discharges ice into Frederick Sound. Most of this ice is grounded on a bar at the head of the inlet of the glacier, but at high tides considerable amounts escape into the sound. The ice ordinarily follows along the east shore of the sound, but it has been reported in considerable amounts at the head of Dry Straits.

The commerce through Dry Straits would be precisely that which would ply through Wrangell Narrows. Under the present conditions, Wrangell Narrows is the rendezvous of a considerable salmon and halibut fishing fleet, which finds therein a sheltered anchorage convenient for delivering their fish to the southbound boats. It is probable, however, that these boats could find another anchorage nearly as advantageous.

In view of the probable high cost of maintenance, the length of time ensuing after commencing the improvement before navigation would be benefited, and other undesirable features of a channel through Dry Straits, I am of the opinion that the locality is not worthy of improvement by the General Government.

Very respectfully,

G. B. PILLSBURY,
Captain, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.

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[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., July 15, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

The object of the preliminary examination reported upon within is to determine the advisability of securing a channel alternative to Wrangell Narrows via Dry Straits. The present route is via Wrangell Narrows, through which a large part of the commerce bound to or from southeastern Alaska now passes, though the heavier-draft vessels are obliged to go by way of Sumner Strait, Christiana Sound, and Chatham Strait, increasing the distance about 90 miles. From an examination and survey of Wrangell Narrows made in 1902 and 1903 it appears that Wrangell Narrows is the only portion of the entire route between Seattle and Skagway, a distance of 1,020 miles, where insufficient depths exist, and its improvement at a cost of approximately $1,600,000, was recommended.

Information as to the value of the commerce affected by the improvement of Dry Straits or Wrangell Narrows is contained within, and in the report on the latter route mentioned above it is stated that the freight tonnage to and from Seattle for the year ending December 31, 1902, amounted to 124,681 tons, valued at $28,364,982. Having in mind the present valuable commerce involved, the probability of its continued growth, and the important influence which adequate transportation facilities will exercise in the development of the Alaskan Territory, the Board is of the opinion that it is advisable for the United States to undertake some work of improvement to secure a better channel than is now available.

It appears that while the initial cost of opening up a channel through Dry Straits would probably be less than the cost of the improvement of Wrangell Narrows, the former channel would require frequent work of maintenance, while the latter would be practically self-maintaining. Physical conditions combine to make Dry Straits less favorable for maintaining a navigable channel than the present route. Situated near the mouth of the Stikine River, it receives a considerable amount of alluvial deposit from that stream, and its western end is exposed to ice discharged by the Leconte Glacier into Frederick Sound. The meeting of the tides at this point would also contribute to the difficulty of maintenance.

While Dry Straits would provide a route to southeastern Alaska about 10 miles shorter than the one through Wrangell Narrows, there has been some commercial development along the latter, and vessels carrying mail are required to pass through this channel to deliver mail at Tonka and Petersburg. In view of the above and the explanation of conditions given within, the Board concurs with the district officer in the opinion that it is not advisable for the United States to undertake the improvement of Dry Straits. No communications have been received from interested parties invited by the district officer to submit statements and arguments to the Board.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 557.

LAKE PONTCHARTRAIN, LA., FROM WEST END TO MILNEBURG.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF LAKE PONTCHARTRAIN, LOUISIANA, FROM WEST END TO MILNEBURG.

JANUARY 23, 1908.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, January 22, 1908.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated 21st instant, together with copy of a report from Maj. J. F. McIndoe, Corps of Engineers, dated December 19, 1907, of a preliminary examination of Lake Pontchartrain, Louisiana, from West End to mouth of Bayou St. John and thence to Milneburg, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

WM. H. TAFT,
Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, January 21, 1908.

SIR: I have the honor to submit herewith for transmission to Congress report of December 19, 1907, by Maj. J. F. McIndoe, Corps of Engineers, on preliminary examination authorized by the river and harbor act approved March 2, 1907, of Lake Pontchartrain, from West End to mouth of Bayou St. John and thence

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From the facts and for the reasons given I concur in the opinion of the district officer, the division engineer, and the Board of Engineers for Rivers and Harbors that this locality is not worthy of improvement by the General Government.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF LAKE PONTCHARTRAIN, LOUISIANA, FROM WEST END TO MOUTH OF BAYOU ST. JOHN, AND THENCE TO MILNEBURG.

WAR DEPARTMENT,
UNITED STATES ENGINEER OFFICE,
New Orleans, La., December 19, 1907.

GENERAL: In compliance with Department letter of March 14, 1907, I have the honor to submit the following report upon a preliminary examination of "Lake Pontchartrain, West End to mouth of Bayou St. John and thence to Milneburg," made in accordance with river and harbor act approved March 2, 1907.

The examination was made by Mr. H. S. Douglas, assistant engineer, and the following is quoted from his report:

The locality may be said to cover the lake front of the city of New Orleans, although the populated and improved portion of the city does not, as yet, extend to the shores of Lake Pontchartrain. West End is at the entrance to the New Basin Canal. The mouth of Bayou St. John (locally known as Spanish Fort) is, of course, the entrance to the bayou of that name and to the Carondelet or Old Basin Canal. Milneburg is the terminal of the Pontchartrain Railroad. The distance from West End to the mouth of Bayou St. John is about 2 miles, and thence to Milneburg about 1¼ miles, a total distance of about 3¼ miles. At West End the New Basin Canal has been prolonged by means of two earthern piers or jetties about one-quarter of a mile beyond the natural shore line into the lake. At Spanish Fort the Bayou St. John has been extended by similar works out into the lake about one-half mile. At Milneburg a long pier or wharf used by the railroad extends out into the lake for about a third of a mile. The examination route was from the extremities of the structures described as nearly in a straight line from point to point as was practicable, the lake on the lines described having an almost uniform depth of 8 feet at average low water.

No natural obstructions to navigation were discovered, and the only artificial ones developed from inspection or inquiry were the piling forming the foundation of the old Southern Yacht Club house, at the entrance to the New Basin Canal at West End, and the decayed wooden revetment at the entrance to Bayou St. John. The abandoned foundation of the Southern Yacht Club is a menace to vessels entering the New Basin Canal, but for that matter so is the entrance itself as now constructed. The entrance to Bayou St. John is in wretched shape, as might be expected when it is known that the charter of the company which now controls it will shortly expire. Careful inquiry has failed to develop any obstructions, to commerce beyond those mentioned. It was suggested that the abandoned railroad pier at Spanish Fort was an obstruction, but no one was found who so considered it. All that could be learned was that small boats, gasoline launches, yachts, and other pleasure craft occasionally encountered floating logs. At the time the examination was made none of these were seen, and it is not considered that a few floating logs would be deemed an obstruction to navigation by ordinarily staunch commercial vessels.

So far as can be ascertained by this office, there is no commerce between West End, Bayou St. John, and Milneburg, and there seems to be no reason at present why there should be. Navigation on Lake Pontchartrain between the points specified appears to be confined to pleasure craft, of which there are great numbers. The only parties

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known to be interested in the improvement are the members of the Louisiana Boat Owners' Association, who consider that navigation of this section of the lake is endangered by floating logs.

In my opinion Lake Pontchartrain from West End to mouth of Bayou St. John and thence to Milneburg is not worthy of improvement by the General Government.

Very respectfully,

J. F. McINDOE,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

OFFICE DIVISION ENGINEER, GULF DIVISION,
New Orleans, La., December 20, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army, concurring in the recommendation of the district engineer, as given within.

E. H. RUFFNER,
Colonel, Corps of Engineers,
Division Engineer.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., January 13, 1908.

Respectfully returned to the Chief of Engineers, U. S. Army.

From the information contained within it appears that when this preliminary examination was made of "Lake Pontchartrain, West End to mouth of Bayou St. John and thence to Milneburg," no natural obstructions to navigation were discovered, and the only artificial ones developed from inspection or inquiry were the piling from the foundation of the old Southern Yacht Club house, at the entrance to the New Basin Canal at West End, and the decayed wooden revetment at the entrance to Bayou St. John. It was learned that small boats—gasoline launches, yachts, and other pleasure craft—occasionally encounter floating logs in this vicinity; but, so far as could be ascertained, there is no commercial navigation in this locality which would justify any work of improvement.

In view of these conditions the Board concurs with the district officer and the division engineer in the opinion that "Lake Pontchartrain, West End to mouth of Bayou St. John and thence to Milneburg," is not worthy of improvement by the General Government. Although interested parties were invited to submit statements and arguments to the Board in behalf of the improvement, no communications of this character have been received.

For the Board:

R. L. HOXIE,
Colonel, Corps of Engineers,
Senior Member Present.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 558.

GUYANDOT RIVER, WEST VIRGINIA.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF GUYANDOT RIVER, WEST VIRGINIA.

JANUARY 23, 1908.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, January 22, 1908.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, United States Army, dated January 21, 1908, together with copy of a report from Maj. J. G. Warren, Corps of Engineers, dated June 14, 1907, of a preliminary examination of Guyandot River, West Virginia, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

WM. H. TAFT,
Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, January 21, 1908.

SIR: I have the honor to submit herewith for transmission to Con- s report of June 14, 1907, by Maj. J. G. Warren, Corps of Engi- , on preliminary examination of Guyandot River, West Virginia, rized by the river and harbor act of March 2, 1907.

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Considerable work has been done on Guyandot River with a view to the removal of obstructions to open-channel navigation. From the facts and for the reasons given I concur in the opinion of the district officer, the division engineer, and the Board of Engineers for Rivers and Harbors that the river is not worthy of further improvement by the United States beyond maintenance of the natural channel by the removal of obstructions interfering with the floating of timber, substantially as carried on heretofore under the original project.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF GUYANDOT RIVER, WEST VIRGINIA.

WAR DEPARTMENT,
UNITED STATES ENGINEER OFFICE,
Cincinnati, Ohio, June 14, 1907.

GENERAL: In compliance with Department letter of March 14, 1907, I have the honor to report upon a preliminary examination of the Guyandot River, West Virginia, as provided for in the river and harbor act approved March 2, 1907.

Three previous examinations of the river have been made. The first was made in 1874–75 under the direction of Maj. William E. Merrill, Corps of Engineers. His report, which may be found in the Annual Report of the Chief of Engineers for 1875, page 747, contains an estimate of the cost of a system of locks and fixed dams to carry slack water to Logan, a distance of about 81 miles from the mouth of the river. The report contains no recommendation as to the advisability of constructing this system.

The second preliminary examination was made by Maj. D. W. Lockwood, Corps of Engineers, in 1894. His report may be found in the Annual Report of the Chief of Engineers for 1895, page 2581, and was adverse to undertaking the construction of locks and dams.

The third preliminary examination was made by Capt. H. F. Hodges, Corps of Engineers, in 1899, and his report is given in the Annual Report of the Chief of Engineers for 1900, page 3397. This examination dealt with the lower 50 miles of the river and the report recommended that the United States make no further improvement of that part of the river except so far as might be necessary to maintain the channel as it existed at that time, free from obstructions. The physical characteristics of the river and of the territory through which it flows are fully given in the report.

The last work of improvement of the river, which consisted in removing obstructions in the channel such as would hinder the floating of logs and rafts, was completed in the fiscal year 1899. Since that time a railroad has been built and is now in operation to a point a short distance above Logan. This railroad follows the river closely, the map showing it to be not farther than a mile from the river at any point. It appears from this that the improvement

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of the river would not afford access to any territory now without means of transportation. With a view to ascertaining the wishes of those interested in the improvement of this river a circular letter was issued from this office.

The articles of commerce in the valley of the Guyandot may be divided into three classes, timber, coal, and miscellaneous merchandise. Of these, timber is of far the greatest importance and would probably form nine-tenths of the tonnage of the river if the latter should be improved. Experience has shown that improvement by locks and dams, whether fixed or of the more expensive movable type, would be harmful rather than beneficial to the timber trade. Further improvement of the river by cutting away overhanging trees and removing obstructions from the channel would benefit the timber interests in the valley, but as the stream as it now is serves the purpose of floating logs to the mills, the benefit would be only local.

There are said to be, and probably are, good deposits of coal in the valley, but none of these would be reached by slack water which are not now accessible by rail. The very small low-water discharge of the river (20 cubic feet per second), together with its crooked course, would probably prevent any great amount of coal being transported by barge, even if slack water should be established.

Transportation of miscellaneous merchandise by river would be very small. The valley is narrow and sparsely settled. It is not rich in agricultural products and there are no manufactories. This commerce would be entirely local.

The small size of the river and the very doubtful benefits to commerce which would arise from its improvement lead me to believe that the expenditure of any large sum for this purpose is unwarranted.

The establishment of slack water would be at large expense both for original cost and for maintenance and, in my opinion, out of proportion to the benefits derived. For this reason it is my opinion that the Guyandot River, West Virginia, is not worthy of further improvement by the United States except the maintenance of the present channel in approximately its present condition, by the removal of such obstructions as seriously interfere with the floating of logs.

No survey is recommended.

Very respectfully, your obedient servant,

J. G. WARREN,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

ENGINEER OFFICE, U. S. ARMY, CENTRAL DIVISION,
Detroit, Mich., June 21, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army, concurring in the views of the district engineer, and in the opinion that the river is not worthy of further improvement by the United States except as indicated in next to the last paragraph of his report.

G. J. LYDECKER,
Colonel, Corps of Engineers,
Division Engineer, Central Division.

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[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., July 8, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

In the within report the district officer gives a brief account of preliminary examinations heretofore made of Guyandot River, to which he refers for information as to the physical characteristics of the stream and the territory through which it flows.

The improvement of this river was first undertaken by a company acting under a charter from the State of Virginia, by the construction of 6 timber locks and dams, carrying slack water from the Ohio River to above the "falls," the upper lock being 30 miles from the Ohio. These structures, however, had about disappeared when the United States commenced work in 1878, in accordance with a project providing for the removal of snags and other obstructions. Under this project, $22,689.90 was expended to June 30, 1904, resulting in fairly good navigation over a distance of 119 miles.

In 1894 Maj. D. W. Lockwood, Corps of Engineers, made an examination of Guyandot River with a view of improvement by locks and dams; and in his report thereon careful consideration was given to the physical adaptability of the stream to improvement for slack-water navigation and the commercial necessity for such improvement. The report on this examination was unfavorable to the improvement specified in the law, as was also a report rendered by Capt. H. F. Hodges, Corps of Engineers, in 1899, on an examination of the river from its mouth to a point 50 miles above, ordered by act of March 3, 1899.

The country tributary to the river contains a large amount of timber and some partially developed coal fields, but it is not particularly well adapted to agriculture, nor has it any large industrial establishments requiring water transportation, and there are no large towns upon its banks. Statistics of commerce contained in the Annual Reports of the Chief of Engineers indicate that the stream carried between 1897 and 1903 an average of 151,000 tons per annum. Nearly all of this commerce was timber and cross-ties, the amount of miscellaneous merchandise varying between 5,000 and 10,000 tons annually.

Owing to the considerable fall of this stream, amounting to about 147.76 feet between the mouth and Logan, 81½ miles above, a radical improvement could only be secured by means of locks and dams, but conditions are not favorable for such an improvement. As this river is paralleled by two streams, its watershed is limited and its low-water discharge, which is reported to be about 20 cubic feet per second, does not vary greatly throughout the dry season. The denudation of the timber lands may be expected in the future to result in slightly increased run-off during flood stages, with a consequently diminished low-water discharge. Slack-water improvement does not appear to be warranted by the insignificant steamboat commerce on the river, and it would be an obstacle rather than an advantage to the floating of timber, which is now the only commerce of importance on the stream. The transportation of coal has recently been provided for by the construction of a railroad from which spurs can be constructed directly to the mines if warranted by the output.

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In the opinion of the Board, no commercial necessity exists for a radical improvement of the river. It concurs with the district officer and the division engineer that the benefits to be derived from such an improvement would not be commensurate with the large expenditure required, and that it is inadvisable to undertake any work other than the maintenance of the natural channel by the removal of obstructions interfering with the floating of timber, substantially as carried on heretofore under the original project for the improvement of the stream.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 559.

ROCKY RIVER HARBOR, OHIO.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF ROCKY RIVER HARBOR, OHIO.

JANUARY 23, 1908.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, January 22, 1908.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated January 21, 1908, together with copy of a report from Lieut. Col. C. McD. Townsend, Corps of Engineers, dated June 14, 1907, of a preliminary examination of harbor at Rocky River, Ohio, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

WM. H. TAFT,
Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, January 21, 1908.

SIR: I have the honor to submit herewith, for transmission to Congress, report of June 14, 1907, by Lieut. Col. C. McD. Townsend, Corps of Engineers, on preliminary examination authorized by the river and harbor act approved March 2, 1907, of harbor at Rocky Ohio, with a view to repairing existing structures and extenthe harbor.

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Between 1872 and 1883, $39,000 was expended by the General Government in constructing a pier on the east side of the river 900 feet in length, and in dredging.

From the facts and for the reasons given I concur in the opinion of the district officer, the division engineer, and the Board of Engineers for Rivers and Harbors that this locality is not worthy of further improvement by the United States.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF ROCKY RIVER HARBOR, OHIO.

ENGINEER OFFICE, UNITED STATES ARMY,
Cleveland, Ohio, June 14, 1907.

GENERAL: In compliance with instructions contained in the Department letter of March 14, 1907, I have the honor to submit the following report of a preliminary examination of the harbor at Rocky River, with a view to repairing existing structures and extension of the harbor, as required by section 3 of the river and harbor act approved March 2, 1907:

The village of Rocky River is a suburb of Cleveland, which, in 1900, had a population of 1,319. It is situated at the mouth of a stream of the same name emptying into Lake Erie at a point 5½ miles westward from the entrance to the harbor of Cleveland. Its harbor consists of the portion of the river in front of the town.

Originally the mouth of the river was obstructed by a bar having a depth of about 4 feet over it, and the general depth of the river in front of the town was about 6 feet. The bed of the river was composed of shale overlaid from 1 to 4 feet with sand.

A project was submitted in 1871 by Maj. W. McFarland, Corps of Engineers, for the improvement of the harbor. Under this project $39,000 was expended from 1872 to 1883 in constructing a pier on the east side of the river 900 feet in length, and in dredging. The work was then abandoned.

Under the provisions of the river and harbor act of June 13, 1902, a preliminary examination of this harbor was made by Maj. Dan C. Kingman, Corps of Engineers, whose report is printed in House Document No. 37, Fifty-eighth Congress, second session, and in the Annual Report of the Chief of Engineers for 1904, page 3222.

The Board of Engineers for Rivers and Harbors, in its review of this examination, expresses the opinion that "it is not desirable to continue the improvement of this locality. It appears that there is little or no commerce involved, almost all vessels using the harbor being pleasure craft."

Since 1902 the deterioration of the east pier has continued, but due to the fact that the contractors constructing the Cleveland breakwater obtained large quantities of shale from Rocky River for that work, a channel of over 12 feet depth has been excavated along the entire harbor front, and a vessel drawing 7 feet can readily cross the bar.

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The number of yachts and other pleasure craft using the harbor have largely increased, but the commerce of the place is inconsiderable, nor is it probable that the river would be much used for commercial purposes if the pier at the harbor entrance was restored. The river empties into the lake through a picturesque gorge with steep, rocky banks, on the top of which the village of Rocky River is located. The valley of the river is narrow and difficult of access.

I am of the opinion that neither the present commerce of this locality nor that reasonably prospective would justify even the limited expenditure that would be required for repairing the existing structures. There are forwarded herewith the letters I have received from interested parties, who have been informed of this adverse report and notified of their right to appeal to the Board of Engineers for Rivers and Harbors.

Very respectfully, your obedient servant,

C. McD. TOWNSEND,
Lieut. Col., Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

ENGINEER OFFICE, U. S. ARMY, CENTRAL DIVISION,
Detroit, Mich., June 17, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army, concurring in the opinion expressed by the district engineer in the last paragraph of his report.

G. J. LYDECKER,
Colonel, Corps of Engineers,
Division Engineer, Central Division.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., July 8, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

Rocky River Harbor was formerly improved by the United States under a project adopted in 1872, and between that year and 1883, when work ceased, $39,000 was expended in the construction of an east pier 900 feet in length, and in dredging. This pier having deteriorated to a considerable extent, interested parties desire its rehabilitation, as indicated by the language of the act of March 2, 1907, providing for the preliminary examination reported upon within, "with a view to repairing existing structures and extension of the harbor."

An examination of Rocky River Harbor was made in 1902, to comply with the provision of the river and harbor act of that year. In its indorsement of December 2, 1902, reviewing the report of the district officer on that examination, the Board expressed the opinion that it was not desirable to continue the improvement of this locality, as there was little or no commerce involved and nearly all vessels using the harbor were pleasure craft.

In the within report the district officer states that the number of yachts and other pleasure craft using the harbor has largely increased, but the commerce of the place is inconsiderable, and it is improbable

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that the river would be much used for commercial purposes if the pier at the harbor entrance were restored. Excepting that pleasure craft visiting the mouth of Rocky River have increased in size and number since the time of the previous examination, there appears to be no change in conditions affecting the advisability of the improvement. Its maintenance as a harbor of refuge, which is now advocated by some of those interested and which was previously urged, appears to be unnecessary, as the harbor of Cleveland is situated but 5½ miles distant.

In view of the above, the Board concurs with the district officer and the division engineer that neither the present commerce of this locality, nor that reasonably prospective, will justify the expenditure required for the repair of the existing structures. Copies of communications from interested parties, accompanying the report of the district officer, have been considered by the Board, but no further information has been received from those who were invited by him to submit statements and arguments to the Board.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

LETTER OF PHILIP E. HINTZ, OF THE CLEVELAND YACHT CLUB.

CLEVELAND, OHIO, *March 19, 1907.*

DEAR SIR: Replying to your favor of the 16th instant, beg to state that the writer knows of no change in the character of the vessels using Rocky River Harbor since Major Kingman's examination in 1902. The writer has visited this spot a great many times since that year and has never yet seen any craft which might be used commercially. However, this is the writer's personal opinion which Commodore Worthington suggested he write in answer to your letter. I would suggest, however, that you take this matter up with the Lakewood Yacht Club, Lakewood, Ohio, which owns an island in and near the mouth of Rocky River. Mr. Prentice, the secretary of that club, would be very glad to furnish you with any information. I, personally, should be very glad at any time to have you call on me for any information which I might or can obtain for your use.

Yours, very truly,

PHILIP E. HINTZ.

Col. C. McD. TOWNSEND.

LETTER OF THE CLIFTON PARK LAND AND IMPROVEMENT COMPANY.

CLEVELAND, OHIO, *March 26, 1907.*

DEAR SIR: Replying to your favor of the 26th instant, beg to say that the only change of importance at the harbor, Rocky River, since 1902, is the dredging of the river from its mouth some distance south of the New York, Chicago & St. Louis Railway bridge to a depth of 12 or 14 feet. This would accommodate the ordinary run of vessels which might find it convenient to run into the harbor in case of a storm, as this is the only place that could be used as a harbor of refuge between Lorain and this city. Of course, there have been a large number of pleasure craft added since the report made in 1902, some of which are very much larger than any in use at that time.

We very much hope that a favorable report may be made, as the increased depth of the river makes this a point of importance as a harbor of refuge.

Very truly, yours,

J. J. CROOKS, *Secretary.*

Col. C. McD. TOWNSEND.

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LETTER OF W. J. BRODIE, OF THE LAKEWOOD YACHT CLUB.

CLEVELAND, *Ohio, April 11, 1907.*

MY DEAR SIR: The Lakewood Yacht Club has appointed Mr. N. C. Catabish and the writer to reply to your inquiry of March 16 regarding present conditions at Rocky River. In answer to your inquiry would say that conditions have materially changed at Rocky River since the survey was made under orders of Maj. Dan C. Kingman, and in the following respects:

The bar at the end of the old Government pier has been dredged away to a depth of 18 or 20 feet; the basin has also been cleaned out, including the shoal in the middle of the harbor, and the river has been dredged up beyond the street bridge at Detroit street, so that a vessel of good draft can now reach that point. There have been several manufacturing plants located on the river, including the Rocky River waterworks. A number of those concerns have expressed to us their earnest wish that the piers might be repaired in order to make entrance into the harbor safe, so that they might secure the advantage of lower freight rates afforded by vessel loads of coal, lumber, etc., instead of being at the complete mercy of the railroads. The amount of money represented by the dredging amounts to a good many thousand dollars, and in order to preserve this work the piers should be repaired. The harbor is still used by the fish tugs to a considerable extent during the fishing season. Also the fleet of pleasure yachts which has made Rocky River its port has increased very greatly—in fact, has increased three or four fold; there are now over 100 boats located here, many of them large yachts of the gasoline-engine type.

I inclose several letters from parties owning property along the river in response to my inquiry whether it would be of any material financial benefit to them to have the piers repaired so that they could secure the entrance of freight by way of boat.

There is no question in my mind but what there is sufficient demand to warrant the repairs to the old pier, for such repairs would open up a lot of desirable manufacturing sites which would unquestionably be of great additional value, especially as the natural conditions are such that an expenditure of a very small amount would secure the results which have been mentioned.

We shall be very glad to give you any special information or personal opinions of property owners of that vicinity if you wish anything of that kind.

Yours, respectfully,

W. J. BRODIE.

Col. C. McD. TOWNSEND.

LETTER OF H. R. NEWCOMB.

THE CITIZENS' SAVINGS AND TRUST COMPANY,
Cleveland, Ohio, March 30, 1907.

DEAR SIR: Relative to the Government piers at Rocky River, would state that if they were repaired there would be a much more extensive use made of the harbor than has ever been made in the past, as Rocky River has been and is now being dredged to such an extent as to enable boats to get up into the river so that its banks can be utilized for commercial purposes.

Yours, very truly,

H. R. NEWCOMB.

W. J. BRODIE, Esq.,
Cleveland, Ohio.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 560.

BLACK RIVER, LORAIN HARBOR, OHIO.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION AND SURVEY OF BLACK RIVER, LORAIN HARBOR, OHIO.

JANUARY 23, 1908.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, January 22, 1908.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated 21st instant, together with copies of reports from Lieut. Col. C. McD. Townsend, Corps of Engineers, dated June 17 and August 23, 1907, of a preliminary examination and survey, respectively, of Lorain Harbor, Ohio, including that portion of Black River from the inner end of the Government piers to the East Erie Avenue Bridge, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

WM. H. TAFT,
Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, January 21, 1908.

SIR: I have the honor to submit herewith for transmission to Congress reports of June 17, 1907, and August 23, 1907, by Lieut. Col. C. McD. Townsend, Corps of Engineers, on preliminary examination and survey, respectively, authorized by the river and harbor act approved March 2, 1907, of Lorain Harbor, Ohio, including that portion of Black River from the inner end of the Government piers to the East Erie Avenue Bridge.

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The investigation thus authorized has for its object to ascertain the advisability of extending the dredging done heretofore between the piers at the mouth of the river up to the East Erie Avenue Bridge, as stated. The estimated cost of the necessary dredging is $23,000; but the sum of $15,000 having been appropriated for this work by the said act of March 2, 1907, an appropriation of an additional $8,000 will cover the cost of completing the improvement in question.

I concur in the opinion of the district officer, the division engineer, and the Board of Engineers for Rivers and Harbors that Lorain Harbor is worthy of further improvement by the United States in the manner now proposed, provided suitable revetments are constructed by the local authorities and the channel maintained by them after completion.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF BLACK RIVER, LORAIN HARBOR, OHIO, FROM THE INNER END OF THE GOVERNMENT PIERS TO EAST ERIE AVENUE BRIDGE.

ENGINEER OFFICE, UNITED STATES ARMY,
Cleveland, Ohio, June 17, 1907.

GENERAL: In compliance with instructions contained in Department letter of March 14, 1907, I have the honor to submit the following report upon a preliminary examination of "Lorain Harbor: That portion of Black River from the inner end of the Government piers to East Erie Avenue Bridge."

Under the original project for the improvement of Lorain Harbor piers were built into Lake Erie on both sides of the outlet of Black River, 200 feet apart, and a channel about 180 feet wide dredged between them. The existing project provides for a width of 300 feet between piers, which has been obtained by rebuilding the east pier on a line 100 feet farther east and tearing out the old structure.

While the channel between piers has been dredged as required by the project, Black River, which has naturally a width of about 200 feet between banks, requires extensive enlargement to render the work done by the General Government of much practical utility. The local authorities have established dock lines along the river from the end of the piers to the property of the United States steel plant, a distance of about 3 miles, which contemplate the widening of the river to not less than 300 feet, except at the East Erie Avenue Bridge, with a reduction in its natural curvature. Considerable work has been done by local authorities in the execution of this project, particularly in front of the property of the American Ship Building Company, but between the inner end of the Government piers and the East Erie Avenue Bridge the width of channel is at present about 180 feet, and it is the desire of the local authorities that this portion of the river be enlarged by the United States to the dock lines which have been established by the city of Lorain. The Baltimore and Ohio Railroad Company has constructed on the

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western side of this portion of the channel a plant for unloading ore and loading coal. The boats moored to its docks occupy a large part of the channel way and render navigation difficult for a considerable commerce which moves farther up the river.

Heretofore the General Government has confined its dredging operations at this locality to the outer harbor and the space between piers, but the river and harbor act of March 2, 1907, authorizes expenditures in Black River as far as the East Erie Avenue Bridge by appropriating $15,000 for the purpose.

I have therefore to report that I consider the widening of the channel of Black River from the inner end of the Government piers to East Erie Avenue Bridge necessary for the proper development of the harbor, and that the commercial interests involved would justify a considerable expenditure for the purpose; and recommend that a survey be made to determine the cost of the work. This survey is estimated at $200.

Very respectfully, your obedient servant,

C. McD. TOWNSEND,
Lieut. Col., Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

ENGINEER OFFICE, U. S. ARMY, CENTRAL DIVISION,
Detroit, Mich., June 19, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army, concurring in the views and recommendation submitted by the district engineer in the final paragraph of his report.

G. J. LYDECKER,
Colonel, Corps of Engineers,
Division Engineer, Central Division.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., June 24, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

The plan of improvement now in progress at Lorain Harbor provides for a protected entrance into the outer harbor, between breakwaters converging toward the lake, having an opening between them at their outer extremities 500 feet in width in prolongation of a channel of ingress at the mouth of Black River 20 feet in depth, which has already been obtained through parallel piers 300 feet apart. The normal width of Black River, however, is only about 200 feet, and with a view to securing a width suitable to the present demands of the port, local interests contemplate a widening of the river to not less than 300 feet for a distance of about 3 miles, except at the East Erie Avenue Bridge.

From the within report and information contained in records pertaining to the improvement of Lorain Harbor, it appears that the commercial development of this port has been so pronounced in recent years as to render increased facilities for navigation necessary in the

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interests of the general public. The commerce of the harbor was reported at 564,055 tons in 1895, while statistics for 1905 indicate an increase to 3,265,486 tons. The improvement desired of the General Government, as indicated by the language of the law, is the extension of the improved channel from the inner end of the Government piers to the East Erie Avenue Bridge. This work the district officer believes to be justified by the commercial interests involved and recommends that a survey be made to determine the cost of the work.

The Board concurs with the district officer and the division engineer, and recommends that a survey be authorized at a cost of $200.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

[Fourth indorsement.]

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, June 26, 1907.

Respectfully submitted to the Secretary of War.

This is a report on preliminary examination of Lorain Harbor, Ohio, authorized by the river and harbor act of March 2, 1907.

Inviting attention to the report of the Board of Engineers for Rivers and Harbors in the preceding indorsement I recommend that a survey of the locality, as proposed, be authorized.

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

[Fifth indorsement.]

WAR DEPARTMENT,
June 27, 1907.

Approved as recommended by the Chief of Engineers in the preceding indorsement.

ROBERT SHAW OLIVER,
Acting Secretary of War.

SURVEY OF BLACK RIVER, LORAIN HARBOR, OHIO, FROM THE INNER END OF THE GOVERNMENT PIERS TO EAST ERIE AVENUE BRIDGE.

ENGINEER OFFICE, UNITED STATES ARMY,
Cleveland, Ohio, August 23, 1907.

GENERAL: In compliance with instructions contained in letter from Office of the Chief of Engineers, dated July 1, 1907, I have the honor to submit the following report of a survey of Harbor: That portion of Black River from the inner end of ernment piers to East Erie Avenue Bridge." The results vey are shown on the accompanying tracing.[a]

As stated in the report on preliminary examination, the ment desired at this locality is the enlargement of the ri

[a] Not printed.

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dock lines which have been established by local authorities, and to the depth of 20 feet below mean lake level.

The estimated cost of the work is:

Removal of 2,500 cubic yards of stone shore protection, at $0.50	$1,250
Dredging 140,000 cubic yards, at $0.14	19,600
	20,850
Contingencies, etc	2,150
Total	23,000

The stone shore protection requiring removal was placed by the Government to prevent waves from cutting around the base of the east pier during storms on Lake Erie. If the General Government undertakes the proposed dredging the local authorities of Lorain are prepared to extend the east pier upstream about 350 feet by a timber structure filled with stone, to construct a dock 500 feet in length just below the East Erie Avenue Bridge, and connect the dock and pier with a sheet-pile bulkhead.

There were received and shipped from Lorain during the year 1906, 4,325,691 tons of freight, an increase of 1,060,000 tons in the past year.

The present commerce of the port is considered sufficient to justify the proposed expenditure, and I have therefore to recommend that the existing project for the improvement of Lorain Harbor be modified so as to provide for the dredging of the portion of Black River between the inner end of the Government piers and East Erie Avenue Bridge, to the existing city dock lines, and to a depth of 20 feet below mean lake level, at an estimated cost of $23,000, provided the local authorities suitably revet the channel when constructed and thereafter maintain the improvement.

Very respectfully, your obedient servant,

C. McD. TOWNSEND,
Lieut. Col., Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

ENGINEER OFFICE, U. S. ARMY, CENTRAL DIVISION,
Detroit, Mich., August 26, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army, concurring in the opinion of the district engineer that the work required for improving the river, as indicated within, is worthy of being undertaken by the Government; and in his recommendation that the existing project for improving Lorain Harbor be modified so as to include the work contemplated by his estimate.

G. J. LYDECKER,
Colonel, Corps of Engineers,
Division Engineer, Central Division.

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[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., September 16, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

In the within report the district officer submits an estimate of cost, in the sum of $23,000, for enlarging that portion of Black River from the inner end of the Government piers to East Erie Avenue Bridge, in Lorain Harbor, by widening the channel to the dock lines which have been established by local authorities, and providing a depth of 20 feet below mean lake level. He believes this work is worthy of being undertaken by the United States, provided the local authorities suitably revet the channel when constructed and thereafter maintain the improvement. The division engineer concurs in the opinion of the district officer as to the advisability of the improvement.

The Board concurs with the district officer and the division engineer in recommending that the project for the improvement of Lorain Harbor be modified to include the enlargement of Black River between the inner ends of the Government piers and the East Erie Avenue Bridge, at an estimated cost of $23,000, provided suitable revetments are constructed by local authorities and the channel maintained by them after completion; and the Board further recommends that no expenditure be made from any future appropriations for this work unless and until satisfactory assurances be given to the Secretary of War, by bond or otherwise, that suitable revetments will be constructed by local authorities and the improvement maintained by them after completion.

The act of March 2, 1907, ordering the above preliminary examination, also authorized the expenditure of $15,000 from the appropriation for improving harbor at Lorain, for "dredging on the easterly side of Black River from the inner end of the easterly Government pier to East Erie Avenue Bridge." This work being included in the project herein submitted by the district officer, at an estimated cost of $23,000, an appropriation of $8,000 will cover the cost of completing the improvement.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 650.

CONGAREE AND BROAD RIVERS, SOUTH CAROLINA.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF CONGAREE AND BROAD RIVERS, SOUTH CAROLINA.

FEBRUARY 11, 1908.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, February 10, 1908.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated 7th instant, together with copy of report from Capt. E. R. Stuart, Corps of Engineers, dated December 20, 1907, of a preliminary examination of Congaree River, South Carolina, from the present head of navigation to the mouth of Broad River, and Broad River from its mouth to Ninetynine Island shoals, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, February 7, 1908.

SIR: I have the honor to submit herewith, for transmission to Congress, report of December 20, 1907, by Capt. E. R. Stuart, Corps of Engineers, on preliminary examination authorized by the river and harbor act approved March 2, 1907, of Congaree River, South Carolina, from the present head of navigation to the mouth of Broad River, and Broad River from its mouth to Ninetynine Island shoals.

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From the facts and for the reasons given I concur in the opinion of the district officer, the division engineer, and the Board of Engineers for Rivers and Harbors that this locality is not worthy of improvement by the General Government at the present time.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF CONGAREE RIVER FROM THE HEAD OF NAVIGATION TO THE MOUTH OF BROAD RIVER, AND OF BROAD RIVER FROM ITS MOUTH TO NINETYNINE ISLAND SHOALS, SOUTH CAROLINA.

WAR DEPARTMENT,
UNITED STATES ENGINEER OFFICE,
Charleston, S. C., December 20, 1907.

GENERAL: I have the honor to submit the following report upon an examination of "Congaree River, from the present head of navigation to the mouth of Broad River, and Broad River from its mouth to Ninety-nine Island Shoals," under section 3 of the river and harbor act approved March 2, 1907.

This river has been previously examined under the river and harbor act approved March 3, 1879. The report of this examination is printed in pages 1010–1032 of Part I, Annual Report of the Chief of Engineers for 1880. This report was noncommittal.

The physical characteristics of this river are set forth in the above report, and show it to be a stream with numerous shoals, caused by outcropping granite ledges.

On account of the completeness of the previous examination the present examination was confined to a personal examination of Lockhart shoals, this being one of the most formidable shoals on the section of the river to be examined, and the town of Lockhart the most important town on it.

The total fall in the Broad River from Ninetynine Islands to its mouth as determined from the Geological Survey maps is approximately 290 feet. The distance is about 94½ miles and the average fall a little more than 3 feet per mile.

On account of the slope and character of the Broad River the only practicable method of improvement is by means of locks and fixed dams, or by lateral canals around the worst shoals and improvement of intervening stretches. The latter method could hardly be used to furnish means for other than pole-boat navigation, which is not believed to be desired by any parties in interest. To overcome a total fall of 290 feet by locks and dams would necessarily involve a heavy expenditure.

The Broad River is at present obstructed by fixed dams, built for power purposes, across the river just above Columbia at Lockhart shoals and at Nealls shoals, and dams are contemplated at Paris shoals (near Alston), at Littleton, and at Ninetynine Island shoals, the latter being under construction. Railroad bridges without draws cross the river at Alston and at Shelton.

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From Columbia to Shelton, a distance of 45 miles, the river is paralleled by railroad; a branch taps it at Lockhart, and the main line of the Southern Railroad crosses it just above Ninetynine Island shoals. The region concerned in this report is not, therefore, destitute of transportation facilities.

Lockhart was visited personally, as being the largest and most important manufacturing community on the portion of the Broad River to be examined. It is a typical mill town, consisting of two cotton mills and the employees, the total population being about 1,600. Power is developed to the extent of 2,200 horsepower by a 26-foot head of water secured by a dam and canal. The monthly output of the mills aggregates 250 tons, and is valued at about $90,000.

The general manager of these mills informed me that no cotton would be shipped by the river if improved for navigation, as they used all the cotton produced in that section and shipped in 8,000 to 9,000 bales yearly in addition. The mills would not care to use water transportation, as they own the local railroad leading from Olney, on the Southern Railroad, to Lockhart. The general manager further stated that they had tried shipment north by water via Charleston, but that such shipment had proven unsatisfactory due to injury to goods through rehandling, and that they preferred to ship by railroad. He also stated that the improvement of the river for navigation would be prejudicial rather than beneficial to the interests centered at Lockhart.

At one time the Broad River was improved for navigation by the State of South Carolina by the construction of lateral canals at two or three of the worst shoals. What remained of the one at Lockhart was inspected and it was found to have had lock chambers about 70 by 12 feet. There was evidence that a boat sluice had been cleared through a part of the shoal near its lower end.

The business interests of the section affected by this improvement are extensive, though inquiry has failed to determine to what extent, if any, these interests would be benefited by the improvement of the river for navigation. No benefit would be conferred by any improvement that did not open the river for steamboat navigation, which could only be done by locks and dams.

No replies giving any information upon which to base an estimate of the benefit that might be conferred by the improvement of the Broad River were received.

Letters from Mr. C. W. Moorman, secretary Chamber of Commerce of Colombia, and from Mr. T. E. Moore, president of the Gaffney Manufacturing Company, of Gaffney, S. C., are appended. Mr. Moore represents extensive milling interests within the area tributary to the portion of the Broad River under examination.

Based upon this examination and the information obtained I am of the opinion that the portion of the river in question is unworthy of improvement by the General Government.

Respectfully submitted.

E. R. STUART,
Captain, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

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[First indorsement.]

OFFICE OF DIVISION ENGINEER, SOUTHEAST DIVISION,
Savannah, Ga., January 2, 1908.

Respectfully forwarded to the Chief of Engineers, U. S. Army.

It is evident from the information contained herein that this section of river under consideration is of a character that can only be improved for navigation by the construction of locks and dams, works which involve a heavy expense. There is nothing at present in the way of commerce that would justify the cost of such works. If the improvement was undertaken now, it would have to be with reference to a future commerce which might be developed and not to immediate needs and requirements.

This is the kind of river that readily lends itself to the development of water power and apparently is now being used in part for this purpose. The improvement of a river by locks and dams is not incompatible with the development of power, and the two can sometimes be combined to their mutual advantage. Where power alone is sought, however, the dams, for reasons of economy, are usually so located as to not form the best pools for navigation, i. e., it is usual to construct the dam at or near the head of the rapids and to convey the water to the wheels by a lateral canal. This leaves the rapids entirely unimproved for navigation. If the improvement were desired for navigation, the dam would have to be placed below the foot of the rapids, so as to back the water up over them, but the power developed would be the same in either case.

If ever the United States adopts a system of improving rivers of this character, both in the interests of navigation and power development, this stream may be found worthy of such improvement, but at present it can not be said that it is worthy of improvement by the General Government for the benefit of navigation alone.

DAN C. KINGMAN,
Lieut. Col., Corps of Engineers,
Division Engineer, Southeast Division.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., January 13, 1908.

Respectfully returned to the Chief of Engineers, U. S. Army.

The Congaree River is formed by the Saluda and Broad rivers, which unite at a point about 2 miles above Columbia, S. C. It is under improvement by open-channel methods, supplemented by one movable lock and dam required to extend steamboat navigation from Granby to Columbia, a distance of about 2 miles.

From the mouth of Broad River to Ninetynine Island shoals, the stretch designated for consideration in the act of March 2, 1907, the distance is about 94½ miles, and the total fall about 290 feet, or a little more than 3 feet per mile. The river has numerous rock shoals and is obstructed by a number of fixed dams constructed for power purposes. An improvement affording adequate facilities for steamboat navigation could be accomplished only by means of an expensive system of locks and dams, and a lesser improvement would suffice only

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for pole-boat navigation, for which there appears to be no commercial demand.

The principal town on the portion of river under consideration is Lockhart, which is an important manufacturing community, having two cotton mills, with an aggregate monthly output of 250 tons, valued at $90,000. From statements contained in the within report and inclosures accompanying it appears that important interests along the river do not advocate its improvement for navigation. Diligent inquiry has failed to elicit any definite information as to the beneficial effects of improving the stream, and the Board has received no communications on this subject from interested parties invited to submit arguments in behalf of the improvement. From the facts presented the Board concurs with the district officer and the division engineer in the opinion that Broad River from its mouth to Ninety-nine Island shoals is not worthy of improvement by the United States.

The act of March 2, 1907, ordering this examination, also called for a preliminary examination of "Saluda River, between Columbia and Hollow Creek."[a] Inasmuch as an unfavorable report has been submitted upon that examination, and the recommendations with reference to the improvement of Broad River are likewise adverse, a similar conclusion must be reached with reference to the "Congaree River, from the present head of navigation to the mouth of Broad River," as no useful purpose would be subserved by a radical improvement of the Congaree above Columbia unless a similar improvement were contemplated in one or both of its affluents above.

For the Board:

R. L. HOXIE,
Colonel, Corps of Engineers,
Senior Member Present.

LETTER OF THE GAFFNEY MANUFACTURING COMPANY.

GAFFNEY, S. C., *November 23, 1907.*

DEAR SIR: I have your letter of October 31 in regard to improving Broad River for navigation.

If this could be done, it would of course give great benefit to this territory, but I deem it impracticable for the reason that there are many shoals and dams already constructed across this stream, and in addition to this the stream is very wide and shallow, and at some seasons of the year the water is very low. At the Nealls shoal they have a 30-foot dam; above this is Lockhart, and the Southern Power Company are building a 70-foot dam now at Ninetynine Islands; the Cherokee Falls Manufacturing Company has a considerable dam at their place, and the Gaston shoals also have a dam above this place.

These obstructions could be overcome by building locks, but if you did this you could only run a very small boat, and the cost of these locks would be out of all proportion to the benefit derived. I would not consider the matter of navigation on Broad River a moment.

We, however, would be glad to have the Congaree River dredged and improved, so that larger boats could be run up to Columbia. This would be of great benefit to us, as it would give us a shorter haul by rail, and we would be glad to see this done, and to this end would cooperate in any way that is

very truly,

T. E. MOORE,
President.

ET,
Engineers.

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[a] Doc. No. 651, Sixtieth Congress, first session.

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LETTER OF THE COLUMBIA CHAMBER OF COMMERCE.

COLUMBIA, S. C., *November 29, 1907.*

DEAR SIR: Replying to your inquiry for statistics as to the probable amount of commerce on the Broad and Saluda rivers above Columbia in the event that they should be opened for navigation, I desire to say that I have made dilligent inquiry at every source from which I might hope for any information, and in no case have I been able to secure anything more than speculation as to what the result of this development would be. Probably no two of those asked for information agreed upon any important point.

I therefore do not feel that from what I have been able to learn I could make a report to you that would give you any aid in reaching conclusions as to the ultimate value of the undertaking.

Yours, very truly,

C. W. MOORMAN,
Secretary.

Capt. E. R. STUART.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 651.

SALUDA RIVER, SOUTH CAROLINA.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF SALUDA RIVER, SOUTH CAROLINA, BETWEEN COLUMBIA AND HOLLOW CREEK.

FEBRUARY 11, 1908.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, February 10, 1908.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated 7th instant, together with copy of a report from Capt. E. R. Stuart, Corps of Engineers, dated December 19, 1907, of a preliminary examination of Saluda River, South Carolina, between Columbia and Hollow Creek, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, February 7, 1908.

SIR: I have the honor to submit herewith, for transmission to Congress, report of December 19, 1907, by Capt. E. R. Stuart, Corps of Engineers, on preliminary examination, authorized by the river and harbor act approved March 2, 1907, of Saluda River, South Carolina, between Columbia and Hollow Creek.

From the facts and for the reasons given I concur in the opinion of the district officer, the division engineer, and the Board of Engi-

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neers for Rivers and Harbors that this locality is not worthy of improvement by the United States at the present time.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF SALUDA RIVER, SOUTH CAROLINA, BETWEEN COLUMBIA AND HOLLOW CREEK.

WAR DEPARTMENT,
UNITED STATES ENGINEER OFFICE,
Charleston, S. C., December 19, 1907.

GENERAL: I have the honor to submit the following report upon a preliminary examination of the Saluda River between Columbia and Hollow Creek, South Carolina, made in compliance with an item in section 3 of the river and harbor act approved March 2, 1907.

The junction of the Broad and Saluda rivers, forming the Congaree River, is just above Columbia. The portion of the Congaree from Columbia to the junction of the Broad and Saluda rivers is ordered examined in connection with an examination of the Broad River,[a] and the present report will therefore be confined to the Saluda River from its mouth to the mouth of Hollow Creek, a distance of about 22 miles.

The Saluda River was examined in 1888 by the engineer officer then in charge of this district, under a clause of the river and harbor act of August 11, 1888. The report of this examination is printed on pages 1205–7, Part II, Annual Report of the Chief of Engineers for 1889. This report was unfavorable.

The present examination was made by myself and Assistant Engineers James P. Allen and W. O. Whitescarver on October 16 and 17, 1907. The entire length of the river under examination was passed over in bateaus constructed especially for the work. The stage of the river was about 1 foot above ordinary low water. The general character of the river may be judged by the fact that at two points it was necessary to walk around the shoals, and at several others it was difficult and possibly dangerous to pass with three men in a bateau. Finally, at the broken Saluda dam, the trip ended, as the boatmen, fairly skilled in that class of boating, considered themselves incapable of taking the boats over the rapids with reasonable safety to themselves.

Hollow Creek empties into the Saluda River about 23 miles above Columbia, and the fall from this point to the mouth as shown by the Geological Survey map, is about 115 feet, or an average of 5 feet per mile. This fall is principally concentrated at a number of shoals or rapids, the most important in their order down the river being—

Gabriels shoal, 6 feet fall.
Smoke shoals, 17 feet fall in 1 mile.
Drehrs shoals, 16 feet fall in 1 mile.
Saluda shoals, 14½ feet fall in one-third of a mile.

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[a] The report on examination of Congaree and Broad rivers is printed in House Doc. No. 650, Sixtieth Congress, first session.

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Below the Saluda dam are a number of shoals aggregating a fall of 18 feet in a distance of about 2 miles.

These shoals all mark the points where the river crosses ledges of granite, and are covered by projecting ledge rock and loose bowlders.

The estimated discharge of the Saluda below Hollow Creek at the time of the examination was 2,100 cubic feet per second, agreeing fairly well with the estimate of 500 to 800 cubic feet per second for the low-water discharge.

This discharge, taken with the slope of 5 feet per mile, indicates that improvement for navigation is possible only by the use of locks and fixed dams or by the construction of lateral canals. The latter plan was at one time carried out by the State of South Carolina, canals being constructed around the worst two shoals. By this means pole-boat navigation was secured. This primitive method of navigation died out and the canals fell into disuse and ruin. Pole-boat navigation of itself is believed to be a thing of the past. No commerce of any importance would be attracted to this river if it were restored.

Inquiry has failed to develop any information upon which to base any estimate of the commerce that might result from the improvement of the stream for navigation. There are no large towns or manufacturing interests that would be served by such an improvement. It is not believed that the farm products of such a limited area would be sufficient in quantity or value for their transportation to warrant the expenditure that would be necessary to render navigable a stream of steep slope and small discharge, such as is the Saluda River.

Reliable information is at hand showing that it was the intention of those interested to have had an examination made of a longer stretch of this river. So far as has been learned, no one considers that the improvement of the portion covered by this examination would confer any benefit at all commensurate with the expenditure involved.

Appended hereto is a copy of a letter from Mr. C. W. Moorman, secretary of the Chamber of Commerce, of Columbia, S. C., showing the failure to secure any data upon which to base any estimate of the probable commerce that might arise as a result of improving the Saluda River for navigation.

It is my opinion, based upon the examination made, that the Saluda River, from Columbia to Hollow Creek, South Carolina, is not worthy of improvement by the General Government.

Very respectfully,

E. R. STUART,
Captain, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

OFFICE OF DIVISION ENGINEER, SOUTHEAST DIVISION,
Savannah, Ga., January 2, 1908.

Respectfully forwarded to the Chief of Engineers, U. S. Army.

I agree with the district officer in his opinion that this river is n worthy of improvement by the General Government at this time.

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is possible, however, that some time in the future it may be improved in such a way as to improve navigation and develop water power, each of these interests bearing a due share of the cost.

DAN C. KINGMAN,
Lieut. Col., Corps of Engineers,
Division Engineer, Southeast Division.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., January 13, 1908.

Respectfully returned to the Chief of Engineers, U. S. Army.

An examination of the within and a former report on preliminary examination of this stream clearly indicates the impracticability of improving it except at great cost by a system of locks and dams. The slope is great, averaging, as it appears within, about 5 feet per mile. At the principal shoals, which consist of ledges of granite and loose bowlders, the fall is concentrated and amounts to 17 feet to the mile in one instance, and 14½ feet in one-third of a mile in another.

It appears to have been impracticable at the time of the examination to navigate this stretch of waterway even in light bateaus, owing to the difficulties encountered at the rapids. Under these conditions there is of course no commerce at the present time, and inquiries failed to bring forth any information in regard to prospective commerce in the event of an improved river. Those believed to be interested were invited to submit their views on the subject of this improvement, but no communications have been received.

Having in mind the facts briefly stated above, the Board concurs with the district officer and the division engineer in the belief that this river is not worthy of improvement by the United States.

For the Board:

R. L. HOXIE,
Colonel, Corps of Engineers,
Senior Member Present.

LETTER OF THE COLUMBIA CHAMBER OF COMMERCE.

COLUMBIA, S. C., *November 29, 1907.*

DEAR SIR: Replying to your inquiry for statistics as to the probable amount of commerce on the Broad and Saluda rivers above Columbia, in the event that they should be opened for navigation, I desire to say that I have made diligent inquiry at every source from which I might hope for any information and in no case have I been able to secure anything more than speculation as to what the result of this development would be. Probably no two of those asked for information agreed upon any important point.

I therefore do not feel that, from what I have been able to learn, I could make a report to you that would give you any aid in reaching conclusions as to the ultimate value of the undertaking.

Yours, very truly,

C. W. MOORMAN,
Secretary.

Capt. E. R. STUART.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 652.

ONANCOCK RIVER, OR CREEK, VIRGINIA.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORTS OF EXAMINATION AND SURVEY OF ONANCOCK RIVER, OR CREEK, VIRGINIA, FROM ITS MOUTH TO THE TOWN OF ONANCOCK.

FEBRUARY 11, 1908.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, February 10, 1908.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated 7th instant, together with copies of reports from Maj. Joseph E. Kuhn, Corps of Engineers, dated July 5 and December 28, 1907, of a preliminary examination and survey, respectively, of Onancock River, Virginia, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, February 7, 1908.

SIR: I have the honor to submit herewith for transmission to Congress reports of July 5, 1907, and December 28, 1907, by Maj. Joseph E. Kuhn, Corps of Engineers, on preliminary examination and survey, respectively, authorized by the river and harbor act approved March 2, 1907, of Onancock River, Virginia, with a view to deepening and straightening the channel for a distance of 5 miles between Chesapeake Bay and Onancock.

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In 1879–1881, and in 1891–1894, some dredgi
a depth of 8 feet across the shoals at the mouth
channel. While some deterioration has natu
improved channels are reported to have held

The plan of improvement now proposed is
the former plans, and consists in dredging a
and 8 feet deep at mean low water across th
in straightening the river channel by cuttir
to a depth of 7 feet at mean low water. Tl
$13,500, and maintenance about $1,000 ani

I concur in the opinion of the district offic
and the Board of Engineers for Rivers and
River is worthy of improvement to the exte

Very respectfully,

Brig. Gen., Chief of

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF ONAN
VIRGINIA, FROM ITS MOUTH TO THI

ENGINEER OFFICE, U

GENERAL: In compliance with instru
ment letter of March 14, 1907, I have the
ing report upon a preliminary examinati
a view to deepening and straightening
miles between Chesapeake Bay and O
river and harbor act of March 2, 1907:

Onancock River, or Creek, is a tribut
eastern shore, lying in Accomac County
is about 40 miles north of Cape Charl
river is west, with a length of about 5 n
to the town of Onancock, which is at th

The river and harbor act of June 18
and survey of Onancock Harbor, repo
the Annual Report of the Chief of En
This report was favorable to the imp
estimate of $10,000 was submitted for
feet wide, across the bar at the mo
channel, 100 feet wide, through the
the wharves.

In 1879 and 1880 Congress m
$8,000, which were applied to drec
the bar, and a 7-foot channel throug
Operations ceased in 1881, under th

The river and harbor act of Aug
amination of Onancock Harbor, re
the Annual Report of the Chief of
In this report it is stated that the i
ried out in the years 1879 to 1881

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bar channel had deteriorated in width and depth so that only from 5 to 5½ feet could be carried. The report of the second examination was likewise favorable to the improvement of the locality, and an estimate of $12,511 was submitted for dredging a channel across the outer and inner bars, 8 feet deep, and with widths of from 300 to 200 feet, respectively.

In the years 1890 and 1892 Congress appropriated a total of $12,511 for carrying out the project based upon the second examination and survey, resulting in the completion, in 1893, of a channel across the outer and inner bars, of the projected dimensions. A map showing the bar channels, as dredged, will be found in the Annual Report of the Chief of Engineers for 1894, page 902.

The present examination is the third one ordered, and was made on May 15 and 16, 1907.

Contrary to expectations, it was found that the previous improvements had held fairly well, and that after a lapse of fourteen years the bar channel still afforded over 7 feet draft, which is the available depth that can be carried to Onancock. The entire channel of the river is very narrow, and from Finneys wharf to Onancock, a distance of 1½ miles, there are a number of sharp turns which are troublesome. The banks of the river are abrupt, and vary from about 10 feet high at Onancock to 2 feet high at the mouth. Between high and low water mark there is a sandy beach on both sides. The mean variation of the tide is about 2 feet.

The direction of the channel across the bar is west-northwest, with shoal water close in on the south side. The bar is formed of a fine compact sand, but the bed of the river is mainly mud. It is stated that the only winds that produce a heavy sea are those from the west and northwest, the shoal waters to the south affording protection against winds from that quarter.

Onancock is a town of about 1,200 inhabitants, with gas, water, and telephones. The town possesses a bank, and some 30 stores, doing about $300,000 worth of business annually. It is about 3 miles from the nearest point of the New York, Philadelphia and Norfolk Railway on the east.

The country adjacent to the river is a productive trucking region, the staple crop being potatoes, both Irish and sweet, of which large quantities are shipped annually.

The annual shipments, by water, from Onancock are stated to be about as follows:

Guano	tons	300
Coal	do	600
Locust posts		1,000
Shingles		400,000
Cypress lumber	feet	100,000
Brick		200,000
Sweet potatoes	barrels	40,000
Irish potatoes	do	15,000
Berries	crates	5,000
Onions	baskets	10,000

Besides Onancock, considerable shipments are handled from Finney's and Mears' wharves, 1½ and 2½ miles, respectively, below Onancock.

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Finney's wharf reports annual shipments as follows:

Sweet potatoes	barrels	21,000
Irish potatoes	do	4,000
Berries	crates	5,000
Oysters	do	100
Eggs	dozen	10,000
Chickens		5,000
General merchandise		$37,000

Mears' wharf reports annual shipments as follows:

Sweet potatoes	barrels	15,000
Irish potatoes	do	5,000
Onions	baskets	2,000
Fish	barrels	600
Oysters	do	500
General merchandise		$30,000

Messrs. Hopkins & Bro., who are the principal shippers at Onancock, and who are familiar with shipments by water via the Onancock River, state that the value of the shipments during the past year amounted to $188,000 and the receipts to $260,000.

The amount and value of the commerce, as shown above, show a considerable falling off from that reported in the Annual Report of the Chief of Engineers for the years 1890–1893, which were as follows:

	Ton .	Value.		Tons.	Value.
1890	18,504	$542,750	1892	44,009	$1,405,460
891	12,687	552,932	1893	397,210	2,001,510

There are at present two steamers, one of 60 and the other of 100 tons, trading regularly on Onancock River. The Baltimore, Chesapeake and Atlantic Railway also runs two boats per week, except in the truck season, when there is a daily boat. Besides the steamers, there are also a number of sailing vessels engaged in commerce. The principal market for the locality is Baltimore.

It appears that the main present difficulty lies in the narrow channel and the sharp bends, although a desire is also expressed for deeper water to enable larger boats to ply upon the river. From all appearances, a comparatively small amount of dredging will be required to effect a material improvement in the channel. For any work in the river proper reasonably permanent results may be expected; but on the bar results will be more uncertain as to permanency. There is little natural current in the river to reenforce the ebb tide, and the maintenance of a dredged channel across the bar will depend largely upon the material thereof and the passage of vessels. Considering that the dredged channel of 8 feet, made in 1894, has so well held to this time, leads me to conclude that with occasional redredging for maintenance, a reasonably stable channel can be secured.

Although the commerce of the river has fallen off in the past fourteen years, it is still considerable, and, with a better channel, may be expected to show an increase. Since 1879, a total of $20,511 has been appropriated for the improvement of the river, and this has sufficed to maintain navigation for a period of twenty-eight years.

Considering only the present commerce, the probability of a moderate cost, and the possible benefits, I am of the opinion that the

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locality is worthy of improvement, and I respectfully recommend that a survey be made with a view to the preparation of a plan and estimate of cost.

It is estimated that a proper survey will cost $400.

Respectfully submitted.

JOSEPH E. KUHN,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

OFFICE OF DIVISION ENGINEER, SOUTHEAST DIVISION,
Savannah, Ga., July 10, 1907.

Respectfully submitted to the Chief of Engineers, U. S. Army.

The locality in question seems to be worthy of a survey and it is recommended that an allotment of $400 be made for this purpose.

DAN C. KINGMAN,
Lieut. Col., Corps of Engineers,
Division Engineer, Southeast Division.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., July 15, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

Under projects heretofore adopted for the improvement of this stream, the sum of $20,511 has been expended since 1879 in dredging a channel 8 feet deep to afford access to the wharves at the town of Onancock. It appears that the work accomplished has maintained itself fairly well, but that the river is very narrow and has a number of troublesome turns. The district officer believes that its further improvement by the United States is advisable, and recommends that a survey be made at a cost of $400, in which recommendation the division engineer concurs.

While the commerce of the stream is not large, it is believed that the cost of the improvement will be inconsiderable and may therefore be justified, but this question can not be absolutely determined without the more precise information which a survey will provide. The Board therefore concurs with the district officer and the division engineer in recommending that such a survey be authorized.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

[Fourth indorsement.]

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, July 18, 1907.

Respectfully submitted to the Secretary of War.

This is a report on preliminary examination of Onancock River, Virginia, authorized by the river and harbor act of March 2, 1907.

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Inviting attention to the report of the Board of Engineers for Rivers and Harbors in the preceding indorsement, I recommend that a survey of the locality, as proposed, be authorized.

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

[Fifth indorsement.]

WAR DEPARTMENT,
July 19, 1907.

Approved as recommended by the Chief of Engineers.

F. C. AINSWORTH,
The Adjutant-General,
Acting Secretary of War.

SURVEY OF ONANCOCK RIVER, OR CREEK, VIRGINIA, FROM ITS MOUTH TO THE TOWN OF ONANCOCK.

ENGINEER OFFICE, UNITED STATES ARMY,
Norfolk, Va., December 28, 1907.

GENERAL: Complying with instructions contained in letter from Office of the Chief of Engineers, dated July 22, 1907, I have the honor to submit the following report upon a survey of Onancock River, Virginia, authorized by the Secretary of War under date of July 19, 1907.

The results of the survey are embodied in the accompanying tracing,[a] which shows the existing channel from the town of Onancock to deep water in Chesapeake Bay. The available depth that can be carried to Onancock is nowhere less than 7 feet at mean low water, but the channel is, in places, very narrow and tortuous.

The channel may conveniently be considered in two portions, the bar channel and the river channel. The former crosses the bar at the mouth of the river at a distance of about 1 mile from shore. The inner and outer slopes of the bar are quite steep, there being only 2,400 feet between the 12-foot contours. The original channel across the bar afforded a depth of about 4 feet.

Under appropriations aggregating $12,511, made in the years 1890 and 1892, channels respectively 300 and 200 feet wide and 8 feet deep were completed in 1893 across the outer and inner bars. A study of the map shows that the channel across the inner bar has not deteriorated appreciably in fourteen years, whereas that across the outer bar has shoaled to 7 feet, with a width of 200 feet between the 6-foot contours in the same time. From the foregoing, a fair idea of the rate of depreciation of a dredged channel across the bar may be inferred.

The only work heretofore done by the Government on the river channel was in 1880 and 1881, at which time a dredged c[illegible] feet deep and 100 feet wide was made through the mud fla[illegible] wharves of Onancock. The depth of 7 feet is still ava[illegible] the channel width has been somewhat reduced, so that ste[illegible] difficulty in reaching the town wharves.

The plan of improvement proposed, and shown on the [illegible] sists in dredging a channel 200 feet wide and 8 feet de[illegible]

[a] Not printed.

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low water across the bar, and in straightening the river channel by cutting off projecting shoals to a depth of 7 feet at mean low water. The resulting river channel will then be nowhere less than 200 feet wide between 6-foot contours, with central depths nowhere less than 7 feet at mean low water, which is believed to be ample for the class of vessels navigating the river.

The estimated quantity of material to be removed under the proposed plan is 45,000 cubic yards, scow measurement, estimated to cost 30 cents per cubic yard, or a total of $13,500.

For maintaining the dredged channels, mainly the channel across the outer bar, it is estimated that $1,000 will be required annually.

The commercial aspects of the improvement have been fully set forth in the report upon the preliminary examination dated July 5, 1907, to which reference is invited. While the value of the water-borne shipments has fallen off considerably from what it was fifteen years ago, it is still considerable, and its value for 1906 was reported at $448,000. The principal market for the region tributary to the river being Baltimore, it may reasonably be expected that water shipments to the latter port will continue so long as the navigation of the stream is maintained. The total appropriations heretofore made for improving Onancock River aggregate $20,511, covering a period of twenty-eight years, or an average annual amount of $733, which has sufficed the needs of an annual commerce averaging over $500,000.

Considering the actual present commerce, and the reasonable cost of the improvement and its maintenance, I am of the opinion that Onancock River, Virginia, is worthy of improvement to the extent proposed by the plan and estimate outlined above.

Respectfully submitted.

JOSEPH E. KUHN,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

OFFICE OF DIVISION ENGINEER, SOUTHEAST DIVISION,
Savannah, Ga., January 2, 1908.

Respectfully forwarded to the Chief of Engineers, U. S. Army.

From the information contained herein it would seem that the cost of the desired improvement will be very moderate and there is every indication that the improvement will be reasonably permanent and that the cost of annual maintenance will be small and that there is a very considerable commerce which will be directly benefited. I am, therefore, of the opinion that the river is worthy of improvement to the extent proposed.

DAN C. KINGMAN,
Lieut. Col., Corps of Engineers,
Division Engineer, Southeast Division.

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[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., January 13, 1908.

Respectfully returned to the Chief of Engineers, U. S. Army.

The information afforded by the survey reported upon within indicates that the channel dredged in 1893 to a depth of 8 feet and width of 300 feet across the outer bar at the entrance to Onancock River has shoaled to 7 feet, but that the inner bar, which was in the same year dredged to similar depth and a width of 200 feet, has not appreciably deteriorated. The channel which in 1880 and 1881 was dredged through the mud flats near the wharves of Onancock has narrowed somewhat, but the depth originally procured is still available.

The work now proposed by the district officer is the dredging of a channel 200 feet wide and 8 feet deep at mean low water across the outer bar, and the straightening of the river channel, as called for by the act, by cutting off projecting shoals to a depth of 7 feet at mean low water. The estimated cost of this work is $13,500, and the cost of its maintenance $1,000 per annum.

The commercial interests which will be benefited by this improvement are fully explained in the district officer's report on preliminary examination. While the water-borne commerce is not as large as in 1892 and 1893, when the last work of improvement was in progress, its valuation for 1906 is reported at $448,000.

Having in mind the comparatively small cost of the work proposed and its maintenance, and the fact that there now exists a commerce of importance which will probably increase with the provision of better facilities for navigation, the Board concurs with the district officer and the division engineer in the opinion that Onancock River is worthy of further improvement by the United States in the manner and to the extent contemplated by the project presented within.

For the Board:

R. L. HOXIE,
Colonel, Corps of Engineers,
Senior Member Present.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 653.

MATINICUS HARBOR, MAINE.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION, WITH PLAN AND ESTIMATE OF COST OF IMPROVEMENT, OF MATINICUS HARBOR, MAINE.

FEBRUARY 11, 1908.—Referred to the Committee on Rivers and Harbors and ordered to be printed, with accompanying illustration.

WAR DEPARTMENT,
Washington, February 10, 1908.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated 7th instant, together with copies of reports from Maj. Geo. A. Zinn, Corps of Engineers, dated October 10, 1907, November 27, 1907, and January 2, 1908, of a preliminary examination, with plan and estimate of cost of improvement, of Matinicus Harbor, Maine, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, February 7, 1908.

SIR: I have the honor to submit herewith for transmission to Congress reports of October 10, 1907, November 27, 1907, and January 2, 1908, by Maj. Geo. A. Zinn, Corps of Engineers, on preliminary examination with plan and estimate of cost of improvement of Matinicus Harbor, Maine, with a view to a harbor of refuge, as authorized by the river and harbor act approved March 2, 1907.

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The plan of improvement proposed contemplates the construction of a small rubble-mound breakwater, extending from Youngs Point to Indian ledge, at an estimated cost of $13,000.

I concur in the views of the district officer, the division engineer, and the Board of Engineers for Rivers and Harbors that this locality is worthy of improvement in the manner indicated.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF MATINICUS HARBOR, MAINE.

UNITED STATES ENGINEER OFFICE,
Portland, Me., October 10, 1907.

GENERAL: In accordance with your letter of March 14, 1907, I have the honor to submit the following report on a preliminary examination of Matinicus Harbor, Maine, with a view to a harbor of refuge.

Matinicus, Maine, is the largest of a group of islands in the Atlantic Ocean, off the mouth of Penobscot Bay, and about twenty miles from Rockland Harbor, Maine.

The project for a harbor of refuge at Matinicus has been reported upon at least twice previously. It was most recently considered in a report on a preliminary examination made in 1887 and published in the Annual Report of the Chief of Engineers for that year, pages 475–477, which discussed Matinicus Roads, between Matinicus and Ragged islands, with additional protection to be furnished by rough stone breakwaters, as the only feasible location for a harbor of refuge. After discussing the question of benefit to navigation and the excessive cost of the breakwaters, it was considered that this locality was not worthy of improvement by the General Government as a harbor of refuge.

I visited Matinicus Island on September 14, 1907, made an examination of the harbor there, and talked with some of the residents on their needs with respect to anchorage grounds and protection from storms. The inhabitants of Matinicus number about 180, and their principal industry is fishing, which is carried on by means of small smacks generally owned and operated by individuals. The group of islands known as Matinicus is out of the way of general commerce and is not visited by large vessels. The channels between the islands are tortuous and the small harbors are difficult to approach and enter in time of storm. A small steamboat runs between Matinicus Island and Rockland, Me., three times a week, but does not remain over night, partly on account of the insufficient protection from storms. It is said that considerable annual losses of property are sustained from storms.

The real need of the islands is, therefore, a small protected harbor in which small boats may lie with safety. Such a harbor can be provided by the construction of a short breakwater, and I am of the [illegible] that it would be a worthy improvement by the General [illegible]nt.

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Since accurate surveys have already been made of this locality, there are sufficient data now in this office to prepare at a very small expense (say $25) a plan of improvement and an estimate of cost of the work proposed.

Very respectfully, your obedient servant,

GEO. A. ZINN,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

NORTHEAST DIVISION ENGINEER OFFICE,
New York, October 11, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army.

I find no facts in the Annual Report of the Chief of Engineers for 1887, nor in the within report, which, either before or after the preparation of an estimate of cost, would lead me to believe that the General Government should establish a harbor of refuge at Matinicus.

I do not deem the locality worthy of improvement by the General Government.[a]

JOHN G. D. KNIGHT,
Colonel, Corps of Engineers,
Division Engineer.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., December 16, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

It appears from the within and the accompanying supplemental report of the district officer that this locality has an annual commerce of about 2,500 tons, consisting principally in coal, fish, grain, lumber and wood; that the vessels arriving and departing number about 500, with an average draft of 9 feet; that this is the home port for quite a number of small fishing vessels carrying on a business of considerable importance; and that there is no adequate shelter in time of easterly storms for these small vessels. It appears that a breakwater of limited extent, which can probably be constructed at moderate cost, will afford the shelter now urgently needed by these small vessels. The district officer states that the cost of the improvement contemplated can be ascertained at an expense of about $25.

In the opinion of the Board the interests involved appear sufficient to justify a moderate expenditure for the protection of this harbor, and it therefore concurs with the district officer and the division engineer in recommending that an estimate be authorized.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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[a] See Colonel Knight's subsequent recommendation on page 6.

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[Fourth indorsement.]

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 19, 1907.

Respectfully submitted to the Secretary of War.

This is a report on preliminary examination of Matinicus Island harbor of refuge, Maine, authorized by the river and harbor act of March 2, 1907.

Inviting attention to the report of the Board of Engineers for Rivers and Harbors, in preceding indorsement, I recommend that preparation of plan and estimate of cost of improvement of the locality, as proposed, be authorized.

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

[Fifth indorsement.]

WAR DEPARTMENT,
December 20, 1907.

Approved as recommended by the Chief of Engineers.

ROBERT SHAW OLIVER,
Acting Secretary of War.

SUPPLEMENTARY REPORT ON PRELIMINARY EXAMINATION OF MATINICUS HARBOR, MAINE.

UNITED STATES ENGINEER OFFICE,
Portland, Me., November 27, 1907.

GENERAL: I have the honor to submit herewith the following data supplementary to my report dated October 10, 1907, on a preliminary examination of Matinicus Harbor, Maine, with a view to a harbor of refuge.

Matinicus, Me., lying as it does in the open ocean, is very much exposed and at the same time has the misfortune of possessing no reasonably safe harbor even for small vessels. In a report of a survey of this locality made in 1875 (published in the Annual Report of the Chief of Engineers for 1876, as Appendix A 17), General Thom submitted estimates of the cost of building breakwaters, but it is assumed that the expense was not thought to be warranted, as nothing has ever been done.

From Henry Young & Co., merchants, I have received a statement of the statistics for the last calendar year, approximating in freight about 2,500 tons, consisting principally in coal, fish, grain, lumber, and wood. They give the number of vessels arriving and departing as 300 steam vessels and 200 sailing vessels, with an average draft of 9 feet, and state that the number of passengers arriving and departing was 3,000.

From Mr. W. Scott Young, postmaster, I have obtained the following information: There are belonging to this place 50 fishing boats which use the harbor daily. They range in size from 20 feet long to 40 feet long. Each vessel carries from 1 to 3 men. These

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boats have an average value of $500 each, and each vessel is fitted with gear of an average value of $250, making an approximate estimate of the value of the fleet about $37,500. He states further that they have about 30 boats and vessels in their harbor for about five months in the year, of an average value of $1,000 each, from 3 to 5 men being employed on each vessel, and each vessel carrying fishing gear valued at about $200. Most of the regular business of Matinicus consists in that done by these fishing vessels, but trading vessels of 100 tons or thereabouts visit the harbor occasionally as freight is offered, and it is stated that during the summer season probably about 100 yachts call. Mr. Young states that during the last ten years 10 vessels, valued at $1,000 each, have been lost that might have been saved had there been suitable shelter. Other floating property, including a wharf and building destroyed by storm, aggregate about $10,000 more.

Practically the entire revenue at Matinicus is derived from lobster catching. Henry Young & Co. state that 180 tons are taken annually from boats. The value of this annual catch is estimated at $48,000, at Matinicus, and as the outlay, aside from boats and gear, is small, that sum essentially represents the returns for labor. The catch is disposed of by shipping via the small steamer running to Rockland, and by sale to small schooners and steamers (lobster smacks) which visit the islands for that purpose. This method of marketing the product necessitates the storing of the live fish, which is done in perforated wooden boxes or cars in the harbor, and oftentimes considerable value is represented by the lobsters so held afloat awaiting opportunity for sale or for more favorable prices.

In reporting Matinicus as worthy of improvement by the General Government I had in mind a work limited to such extent as would be commensurate with the property interests involved and the importance of the harbor. It was not expected to attempt to justify any extended or expensive operations. That some refuge from storms is badly needed is unquestionable, and it is believed that the situation can be much relieved without going to great expense. The improvement had in mind at the time of my first report was a breakwater about 450 feet long, extending from Youngs Point to Indian ledge. This would give a secure inner harbor in which the fishing fleet could take refuge during easterly storms, which are the only ones liable to cause much damage, at which time the waves surge into the harbor with tremendous force, oftentimes driving the light fishing craft ashore and even endangering wharves and buildings. A short breakwater would protect the upper part of the harbor and give a small but secure place of anchorage during such times of emergency. General Thom, in his report of 1875, described this as breakwater No. 1, and estimated the cost at $21,400. It is believed that he planned a much more elaborate structure than would be regarded as necessary at the present time, and the " survey " is expected to show that a satisfactory structure can be put in for probably not to exceed 60 per cent of his estimate of cost.

In an interview with representative citizens of Matinicus on the occasion of my visit, I learned that a rough stone breakwater from Youngs Point to Indian ledge will give them all that they desire or expect.

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In view of the small amount involved and the importance of the fishing fleet to the citizens of Matinicus, I am still of the opinion that the harbor is worthy of improvement by the National Government to the limited extent indicated above.

A tracing showing the location of the proposed breakwater is forwarded in a separate roll.

Very respectfully, your obedient servant,

GEO. A. ZINN,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer).

[First indorsement.]

NORTHEAST DIVISION ENGINEER OFFICE,
New York, December 4, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army.

In view of the additional information supplied herein, I recommend that an allotment of $25 be made for preparation of plan and estimate of cost, with a view of determining whether the improvement should be undertaken by the General Government.

JOHN G. D. KNIGHT,
Colonel, Corps of Engineers,
Division Engineer.

PLAN AND ESTIMATE OF COST OF IMPROVEMENT OF MATINICUS HARBOR, MAINE.

UNITED STATES ENGINEER OFFICE,
Portland, Me., January 2, 1908.

GENERAL: 1. I have the honor to submit the following plan and estimate of cost of improvement of Matinicus Harbor, Maine, with a view to a harbor of refuge.

2. Under the provisions of the river and harbor act approved March 2, 1907, a preliminary examination was made of the above mentioned locality and a report was submitted under date of October 10, 1907. On November 27, 1907, a supplementary report containing statistical information, and accompanied by a tracing showing the locality and a breakwater proposed for its improvement, was forwarded. This map, which should be referred to for an understanding of the proposed project or plan of improvement, is based on a survey made in 1875 under the direction of Gen. George Thom. The original of the map is on file in this office, and as the shores and bottom of the harbor are almost entirely of ledge it may be assumed that conditions have not materially changed, and that a new survey is not necessary.

3. The harbor of Matinicus is practically the only one at the island, is on the easterly side, and is much exposed. About this small harbor has grown up a small fishing village, and it is here that the stores

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and wharves are located, and from here that communication with the mainland is conducted.

4. As indicated in my supplementary report of November 27, 1907, a fishing fleet valued at about $37,500 makes its headquarters at Matinicus Harbor, and the annual catch of the fleet has been estimated at about $48,000. To this must be added the supplies of various kinds needed for the support of the population.

5. The plan of improvement proposed is the construction of a rough stone breakwater about 450 feet long, extending from Youngs Point to Indian ledge. The width should be 10 feet on top, and the work should be built to a height of 15 feet above mean low tide, with side slopes of 1 on 1½. Such a breakwater would provide a protected area in the upper part of the harbor, small but sufficient for the anchorage of the fishing fleet in times of easterly gales, which at other times anchors in the deep water in the southerly part of the harbor. It would also protect the wharves and the shore in front of the hamlet from the heavy seas resulting from easterly winds. Under present conditions there is no refuge for the fleet from easterly gales.

6. Such a breakwater it is estimated could be built for a total sum of $13,000; the type of construction to be a rough stone dump, the top stone to be in pieces weighing not less than from four to five tons each.

7. This breakwater corresponds to the one referred to as No. 1 in the estimate submitted in 1875, the probable cost then being given as $21,400. This called for an expensive type of construction not now regarded as necessary. That estimate also called for two other breakwaters, the aggregate cost for the improvement being given as $36,000. It is thought, however, that the construction of one breakwater at a cost of $13,000 would afford sufficient protection and is all the business of the place would justify.

8. It is my opinion that a breakwater built in accordance with the above plan will be a permanent structure and that there will be no maintenance charges to provide for—at least the only cost, if any, of repairs will be at such infrequent intervals and in such slight amounts as to be practically negligible.

9. No additional information has been secured since my preliminary report of November 27, 1907, touching the business at Matinicus. From data already given and impressions received at the time of my personal visit, I have formed the opinion that the locality is worthy of improvement by the National Government to the limited extent indicated above. If because of the existence of such a breakwater the loss of one boat per year can be avoided, it will mean a saving amounting to about 6 per cent on the total proposed outlay.

10. The mean range of tide at Matinicus is about 9 feet.

Very respectfully, your obedient servant,

GEO. A. ZINN,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

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[First indorsement.]

NORTHEAST DIVISION ENGINEER OFFICE,
New York, January 4, 1908.

Respectfully forwarded to the Chief of Engineers, U. S. Army.

I am of opinion that the interests involved justify the improvement by the General Government of the harbor of Matinicus, Maine, to the extent of the construction of a breakwater as proposed in paragraph 5 herein and at the cost ($13,000) estimated in paragraph 6.

JOHN G. D. KNIGHT,
Colonel, Corps of Engineers,
Division Engineer.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., January 13, 1908.

Respectfully returned to the Chief of Engineers, U. S. Army.

In the within report the district officer estimates that a suitable breakwater can be constructed between Youngs Point and Indian ledge at a total cost of $13,000, which will afford adequate protection to vessels and property in Matinicus Harbor.

Having in mind the small cost of the proposed breakwater and the undoubted benefit which its construction will confer upon the fishing interests centered at this locality, by preventing losses similar to those which have resulted from easterly storms in the past, the Board concurs with the district officer and the division engineer in the opinion that Matinicus Harbor is worthy of improvement to the extent contemplated by the project now presented.

For the Board:

R. L. HOXIE,
Colonel, Corps of Engineers,
Senior Member Present.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 654.

POTOMAC RIVER AT MOUNT VERNON, VA.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORTS OF EXAMINATION AND SURVEY OF POTOMAC RIVER AT MOUNT VERNON, VA.

FEBRUARY 11, 1908.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, February 10, 1908.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated 7th instant, together with copies of reports from Maj. Spencer Cosby, Corps of Engineers, dated June 19 and December 26, 1907, of a preliminary examination and survey, respectively, of the Potomac River at Mount Vernon, Va., made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

THE SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, February 7, 1908.

SIR: I have the honor to submit herewith for transmission to Congress reports of June 19, 1907, and December 26, 1907, by Maj. Spencer Cosby, Corps of Engineers, on preliminary examination and survey, respectively, authorized by the river and harbor act approved March 2, 1907, of Potomac River, with a view to obtaining a channel to the wharf at Mount Vernon, Va.

This channel was created with funds appropriated by Congress in 1879–1881, and was further improved in 1888–1891, to provide a navigable depth of about 10 feet. The total of appropriations to

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date is $17,000. Some deterioration has taken place, and it is now estimated that it will cost $11,000 to restore the 10-foot channel with adequate widths.

This improvement is neither urged nor required as a commercial necessity, and it is believed that the propriety of having the work done by the General Government is a question which only Congress in its wisdom should decide.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF POTOMAC RIVER AT MOUNT VERNON, VIRGINIA.

UNITED STATES ENGINEER OFFICE,
Washington, D. C., June 19, 1907.

GENERAL: In compliance with instructions from the Chief of Engineers, I have the honor to submit the following report of a preliminary examination of "Potomac River [Virginia], with a view to obtaining a channel to wharf at Mount Vernon," made in accordance with the requirements of section 3 of the river and harbor act approved March 2, 1907.

GENERAL DESCRIPTION OF LOCALITY.

Mount Vernon, the former home and the burial place of George Washington, is situated on the right bank of the Potomac River about 14½ miles below the steamboat wharf at Washington, D. C. It is visited annually by many thousands of persons from the United States and foreign countries and has long been a place of national interest.

Between the wharf at the Mount Vernon estate and the navigation channel of the river, a distance of about 1,900 feet, there are flats on which the depth was originally but 4 feet at low tide. Great difficulty was often experienced, in consequence, in making landings, even with the light-draft steamer formerly in use, and during low tides passengers were frequently obliged to land in rowboats.

PREVIOUS WORK OF IMPROVEMENT.

The first project for improving these conditions was adopted by Congress March 3, 1879, and provided for dredging a channel 150 feet wide and from 6 to 7 feet deep between the main channel of the Potomac River and the Mount Vernon wharf, with a turning basin at the wharf having a radius of 150 feet, all at an estimated cost of $14,000. In 1888 the project was amended so as to provide for a channel 200 feet wide, and from 9 to 10 feet deep, with a turning basin of 200 feet radius, the estimated cost of the project being increased to $26,000.

Between March 3, 1879, and September 19, 1890, the sum of $17,000 was appropriated, of which $16,497.14 was expended in improving the channel. Upon the completion of this work in May, 1891, the channel was 155 feet wide, with a depth of from 8 to 10 feet at [illegible] the turning basin was of the same depth for a radius

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of 180 feet. These dimensions were considered to afford ample facilities for navigation and no further work was done by the United States. No work has ever been done upon the channel by private parties, as far as known.

OBSTRUCTION TO NAVIGATION.

The long cut across the flat has shoaled and narrowed somewhat by the deposit of silt since the completion of the work in 1891, and the ruling depth is now about 6 feet at mean low tide, with a minimum width of about 120 feet. The depth in the turning basin is generally from 7 to 10 feet, and a considerable portion of the old dredged channel still retains a depth of 10 feet.

IMPROVEMENT DESIRED.

The improvement desired is the dredging of a channel 10 feet deep and 150 feet wide, with a turning basin of the same depth and ample dimensions at the Mount Vernon wharf. The material is soft mud, which can be readily excavated and conveniently deposited by the hydraulic process upon an adjacent marsh on the Mount Vernon estate, which would be materially improved thereby. The amount of work required is not large, and no protection works are required, although it is anticipated that some redredging would be required at intervals of from five to fifteen years, depending largely upon the freshets in the river.

PRESENT TRADE.

The Mount Vernon estate is and has been for nearly fifty years under the control of the Mount Vernon Ladies' Association.

To insure satisfactory boat service the association entered into an agreement some years ago with the Mount Vernon and Marshall Hall Steamboat Company, an independent corporation, whereby that company was granted for a certain period the exclusive right to land passengers at the wharf, and in return has to provide a suitable steamer run upon a satisfactory schedule. This agreement will not expire for a year or two.

The steamer *Macalester*, which is operated by the above-named company, is 200 feet long, of 6 feet draft, with a gross tonnage of 624, and is licensed to carry 1,700 passengers. A schedule of two trips daily from Washington is maintained throughout the year, except for about two or three months in the winter when the boat is laid up. The number of passengers carried to Mount Vernon during the calendar year 1906 was somewhat over 40,000 and is gradually increasing. The freight traffic to that point consists almost exclusively of household supplies and miscellaneous freight for use on the Mount Vernon estate and does not amount to over 100 tons per annum. There is practically no shipment of produce from the surrounding country from this wharf, though (except for the Government wharf at the military post of Fort Hunt) it is the first wharf accessible to river steamers on the Virginia side of the Potomac below Alexandria, and at the time the project for the improvement was adopted it was understood that such shipments would be permitted and encouraged by the Mount Vernon authorities.

As a result of the monopoly of traffic granted the Mount Vernon and Marshall Hall Steamboat Company, passengers for Mount

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Vernon are charged 75 cents for the round trip from Washington (of which 25 cents is paid to the Mount Vernon Association for admission to the grounds), while other passengers are carried on the same trip of the same steamer to Marshall Hall, about 1½ miles farther down the river, for 25 cents a round trip (or half the steamer fare charged passengers to Mount Vernon).

Since 1892 the Washington, Alexandria and Mount Vernon Electric Railway Company has been in operation and Mount Vernon is thus rendered accessible from Washington independently of the steamboat line. The round-trip fare on this trolley line is 75 cents.

PROSPECTIVE BENEFITS.

The improvement is desired solely with a view to the continuance of the present traffic by boat, which will become uncertain and irregular if the channel is permitted to shoal. The establishment of a new line of steamers is not contemplated, nor is any reduction in rates apparently in prospect. The attached communication * from Mrs. J. V. R. Townsend, representing the Mount Vernon Ladies' Association, states clearly their reason for asking the Government to dredge the channel. It is to be noted that even if this were made 10 feet deep as desired, distinguished guests taken by the Government to Mount Vernon by river would still have to be landed by means of row boats or launches, as the vessels used to convey them generally draw over 10 feet.

CONCLUSION.

The historic and patriotic associations clustering about Mount Vernon and the desirability of making it as accessible as possible to the general public render it worthy of special consideration. The fact that the traffic is now limited almost exclusively to carrying passengers should not of itself militate against the desired improvement.

If all vessels were permitted to land passengers at the wharf upon equal terms, the traveling public would doubtless be benefited by a reduction of rates, while the Mount Vernon Ladies' Association would receive the same per capita fee for admissions and probably a greater total revenue from this source. Material benefit would also result to the residents of the vicinity if they were permitted to ship and receive freight at the wharf. Under these conditions the locality would seem worthy of further improvement by the Government.

On the other hand, the improvement of the channel at public expense under present conditions would be for the sole benefit of a monopoly, and seems unwarranted. The owners of the only steamer which has the use of the channel should bear the expense of opening up and maintaining it.

As long as the existing conditions continue, this channel is, in my opinion, not worthy of further improvement by the General Government.

Very respectfully,

SPENCER COSBY,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

* Not printed.

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[Second indorsement.]

U. S. ENGINEER OFFICE, EASTERN DIVISION,
New York City, June 26, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

In my opinion, the position taken by the district officer in the within case is correct, according to the customary considerations that have force in determining the worthiness or unworthiness of items of this general character in the river and harbor bills.

The conditions at Mount Vernon are different from those that exist in all other localities where Government aid is sought in the interests of commerce. That a suitable water route between Washington and Mount Vernon is highly desirable requires no argument. That the association having charge of Mount Vernon should take such steps as are necessary to insure a proper and orderly conduct of its affairs in connection with its trust is evident. That it should control its landing or wharf, to prevent the grounds from being overcrowded by cheap excursions, is a matter of great importance.

I respectfully recommend that an estimate of cost of making a suitable channel to the Mount Vernon wharf be prepared and submitted, after a survey, if one is necessary, in order that Congress may have all the facts before it in determining the advisability of making or not making a suitable appropriation for the channel in question.

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Division Engineer.

[Fourth indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., July 22, 1907.

Respectfully returned to the Chief of Engineers, U. S. Army.

The within report contains a comprehensive explanation of existing conditions at Mount Vernon, and particularly of those features which have a bearing upon the necessity and advisability of undertaking further improvements at this locality. In addition to the report of the district officer, the Board has given careful consideration to a communication submitted by Mrs. Justine Van Rensselaer Townsend, regent of the Mount Vernon Ladies' Association, and has listened to statements made in behalf of the improvement by Mr. Harrison H. Dodge, who appeared before the Board at its meeting of this date.

Between 1879 and 1891 the United States expended the sum of $16,497.14 in improving the channel to the wharf at Mount Vernon. The last project, which was adopted in 1888, provided for a channel 200 feet wide and from 9 to 10 feet deep, with a turning basin of 200 feet radius, at an estimated cost of $26,000. The project was not entirely completed, but dimensions adequate for the needs of navigation were secured. The long channel has shoaled and narrowed somewhat by the deposit of silt since the completion of the work in 1891, and further improvement is now desired to secure a channel 10 feet deep and 150 feet wide, with a turning basin of the same depth and ample dimensions at the Mount Vernon wharf.

There is now little or no water-borne freight commerce to or from Mount Vernon, but there are annually over 40,000 passengers carried by boat to and from the wharf. Moreover, there are other

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portant factors which would appear to render the provision of a suitable channel to Mount Vernon worthy of special consideration. The Board therefore concurs with the division engineer in recommending that an estimate of cost be authorized, together with such survey as may be necessary for that purpose.

For the Board:

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

[Seventh indorsement.]

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, July 30, 1907.

Respectfully submitted to the Secretary of War.

This is a report on preliminary examination of Potomac River at Mount Vernon, Virginia, authorized by the river and harbor act of March 2, 1907.

Inviting attention to the report of the Board of Engineers for Rivers and Harbors, in fourth indorsement hereon, I recommend that a survey of the locality, as proposed, be authorized.

The cost of this survey is estimated at $200.

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

[Eighth indorsement.]

WAR DEPARTMENT,
July 31, 1907.

Approved as recommended by the Chief of Engineers.

F. C. AINSWORTH,
The Adjutant-General,
Acting Secretary of War.

SURVEY OF POTOMAC RIVER AT MOUNT VERNON, VIRGINIA.

UNITED STATES ENGINEER OFFICE,
Washington, D. C., December 26, 1907.

GENERAL: In accordance with instructions contained in Department letter of August 5, 1907, I have the honor to submit the following report of a survey of a portion of the Potomac River in front of the wharf at Mount Vernon, Virginia, together with a project and estimate for the improvement desired.

The survey was made November 4 and 13, 1907, by Mr. William B. Harrison, junior engineer. The work has now been plotted and a map [a] of the locality prepared, a copy of which is forwarded herewith, showing the actual depths of water in the channel leading to the Mount Vernon wharf referred to in my report, dated June 19, 1907, of the preliminary examination.

The existing conditions bearing upon the desired improvement were described in that report. The survey shows that there is still a minimum depth of 10 feet throughout the Mount Vernon channel, though the cut having this depth is now only from 40 to 60 feet wide.

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[a] Not printed.

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The steamer *Macalester*, for whose benefit the improvement is desired, has a beam of about 30 feet.

The following is the estimated cost of dredging a channel 150 feet wide and 10 feet deep at low tide through the flats in front of the wharf at Mount Vernon, with a turning basin at the wharf of the same depth, 300 feet wide and 400 feet long, as shown in red lines on the map:

Dredging 46,000 cubic yards, at 20 cents	$9,200
Contingencies, engineering, etc	1,800
Total	11,000

As the existing 9-foot channel leading to the Mount Vernon wharf is nowhere less than 70 feet wide, the need for redredging is not as urgent as was believed at the time of the preliminary examination. However, there can be no doubt that the channel is steadily becoming shallower, and that navigation by the one boat using it would be facilitated by doing the dredging estimated for above. I am still of the opinion that the dredging ought to be done by the corporation owning that boat, rather than by the Government.

Very respectfully,

SPENCER COSBY,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First Indorsement.]

U. S. ENGINEER OFFICE, EASTERN DIVISION,
New York City, December 27, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army.

Although the position taken by the district officer in this matter, as stated in the concluding paragraph of his report, is technically correct, I am not prepared to state that in my opinion the work is not a proper one for the General Government to undertake, believing that, owing to the peculiar circumstances, it is a question for the decision of Congress, which will now have all the pertinent facts before it.

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Division Engineer.

[Third Indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., January 13, 1908.

Respectfully returned to the Chief of Engineers, U. S. Army.

In the within report it is estimated that the channel leading to the wharf at Mount Vernon can be dredged to a width of 150 feet and a depth of 10 feet, and a suitable turning basin excavated at its inner end, at a total cost of $11,000.

From the history of the improvement of this locality contained in the district officer's report on the preliminary examination it appears that the original project of 1879 had in view the construction of a channel 150 feet wide and from 6 to 7 feet deep between the main

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channel of the Potomac River and the Mount Vernon wharf, with a turning basin at the wharf having a radius of 150 feet. This project was modified in 1888 to provide a channel width of 200 feet and a depth of 9 to 10 feet, with a turning basin having a radius of 200 feet. Operations under this project continued until May, 1891, when a channel suitable to the needs of navigation, though somewhat less than the project dimensions, had been completed. The present survey indicates that there has been no appreciable impairment of the depth last obtained, but the channel has narrowed to a width of 40 to 60 feet.

It is acknowledged by persons interested in the improvement of this channel that the locality has no commercial importance, and the work is urged solely on account of the patriotic and historical associations which have constituted Mount Vernon a place of unusual public interest. Throughout a period of nearly fifty years the Mount Vernon Ladies' Association has endeavored to maintain the buildings and grounds in proper condition, and in this task it has deemed it essential to exercise certain restrictions calculated to prevent the indiscriminate use of the wharf and grounds. The district officer invites attention particularly to the fact that the association some years ago entered into an agreement with a steamboat company, by which that company was granted for a certain period the exclusive right to land passengers at the wharf. For this reason, he believes that the owners of the only steamer which has use of the channel should bear the expense of opening up and maintaining it, and he therefore concludes that as long as existing conditions continue the channel is not worthy of further improvement by the General Government.

The Board recognizes the fact that if the merits of this case were measured according to the standards generally applied to proposed river and harbor works the locality could not be considered worthy of improvement, but in recommending the survey which is reported upon within the Board gave special weight to the peculiar conditions which affect this case and which have heretofore been considered sufficient reason for the improvement of the locality by the United States. Congress having already determined that these conditions merit recognition, without regard to commercial considerations, it seemed desirable that the cost of rehabilitating the channel to its former condition of usefulness should be ascertained in order that definite action with that end in view might be taken if deemed advisable.

In view of the facts briefly stated above, the Board concurs with the division engineer in the opinion that the advisability of undertaking further work on the channel to the wharf at Mount Vernon is a question for the decision of Congress, which will now have all the pertinent facts before it.

For the Board:

R. L. Hoxie,
Colonel, Corps of Engineers,
Senior Member Present.

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60TH CONGRESS, 1st Session. | HOUSE OF REPRESENTATIVES. | DOCUMENT No. 665.

PENSACOLA BAY AND SANTA ROSA SOUND, FLORIDA.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF CHANNEL FROM PENSACOLA BAY TO THE QUARANTINE STATION ON SANTA ROSA SOUND, FLORIDA.

FEBRUARY 13, 1908.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, February 12, 1908.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated February 11, 1908, together with copy of a report from Capt. H. B. Ferguson, Corps of Engineers, dated November 14, 1907, of a preliminary examination of Pensacola Bay, Florida, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, February 11, 1908.

SIR: I have the honor to submit herewith for transmission to Congress report of November 14, 1907, by Capt. H. B. Ferguson, Corps of Engineers, on preliminary examination authorized by the river and harbor act approved March 2, 1907, of Pensacola Bay, Florida, with a view to getting 24 feet of water to the quarantine station.

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From the facts and for the reasons given I concur in the opinion of the district officer, the division engineer, and the Board of Engineers for Rivers and Harbors that this locality is not worthy of improvement in the manner indicated.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF CHANNEL FROM PENSACOLA BAY TO THE QUARANTINE STATION ON SANTA ROSA SOUND, FLORIDA.

UNITED STATES ENGINEER OFFICE,
Montgomery, Ala., November 14, 1907.

GENERAL: I have the honor to submit the following report on the preliminary examination of "Pensacola Bay to quarantine station, with a view to getting 24 feet of water," as provided for in river and harbor act approved March 2, 1907:

To open this channel, giving it a depth of 24 feet and a width of 200 feet, would require the removal of about 225,000 cubic yards. The quarantine station is on the north side of Santa Rosa Island, about 8 miles from western end of this island.

I have been unable to obtain any evidence of any material advantage gained thereby, but it is presumed the advantage will be that the deeper draft vessels will be able to reach quarantine station instead of the quarantine officials coming in their boat to vessels in the deep water of the harbor.

When the dredge *Caucus* has secured the channel contemplated for the entrance to Pensacola Harbor, she would be available for this work to quarantine station, and with her the work could be done very economically, but at the present time I deem this improvement from Pensacola Bay to quarantine station to be unworthy of being undertaken by the General Government.

Very respectfully,

H. B. FERGUSON,
Captain, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

OFFICE DIVISION ENGINEER, GULF DIVISION,
New Orleans, La., November 15, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army, concurring in the recommendation of the district engineer, as stated within.

E. H. RUFFNER,
Colonel, Corps of Engineers,
Division Engineer.

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[Fourth indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., January 31, 1908.

Respectfully returned to the Chief of Engineers, U. S. Army.

The preliminary examination reported upon within has in view the dredging of a channel 24 feet deep from Pensacola Bay to the quarantine station, which is on the north side of Santa Rosa Island, about 8 miles from its western end.

From the information contained in the report of the district officer and a letter from the Gulf Transit Company,[a] which is the only interest that has submitted a statement in behalf of the work, it appears that the proposed channel is desired in order to permit the deeper draft vessels to proceed to quarantine station instead of awaiting the arrival of the quarantine officials at the anchorage, 2 or 3 miles distant. While such an improvement, if maintained, would make access to the quarantine wharf possible to vessels desiring to coal and depart from the port with as little delay as practicable, it is not certain that they would make use of it. In any event, the delay complained of is not of great moment to general commerce, and if necessary may apparently be avoided by additional quarantine facilities.

For the reasons briefly given above, the Board concurs with the district officer and the division engineer in the opinion that it is not advisable for the United States to undertake the improvement of "Pensacola Bay to quarantine station, with a view to getting 24 feet of water."

For the Board:

H. F. HODGES,
Lieut. Col., Corps of Engineers,
Senior Member Present.

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[a] Not printed.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 666.

HATCHEE RIVER, TENNESSEE.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF HATCHEE RIVER, TENNESSEE, UP TO THE TOWN OF BROWNSVILLE.

FEBRUARY 13, 1908.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, February 12, 1908.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated 11th instant, together with copy of a report from Maj. William W. Harts, Corps of Engineers, dated December 23, 1907, of a preliminary examination of Hatchee River, Tennessee, to the town of Brownsville, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, February 11, 1908.

SIR: I have the honor to submit herewith for transmission to Congress report of December 23, 1907, by Maj. William W. Harts, Corps of Engineers, on preliminary examination of Hatchee River, Tennessee, to the town of Brownsville, as authorized by the river and harbor act of March 2, 1907.

Appropriations aggregating $35,500 were made by Congress between 1880 and 1892, and expended in clearing the stream of snags, leaning

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trees, logs, etc., from the mouth to Bolivar, some distance above Brownsville.

From the facts and for the reasons given in the accompanying report, I concur in the opinion of the district officer, the division engineer, and the Board of Engineers for Rivers and Harbors that this locality is not at this time worthy of further improvement by the General Government.

Very respectfully, A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF HATCHEE RIVER, TENNESSEE, UP TO THE TOWN OF BROWNSVILLE.

ENGINEER OFFICE, UNITED STATES ARMY,
Nashville, Tenn., December 23, 1907.

GENERAL: In accordance with the instructions of your letter of March 14, 1907, I have the honor to submit the following preliminary report on the Hatchee River, Tennessee, as required by the provisions of the act of Congress of March 2, 1907. The Hatchee River was inspected by me personally at several places in December, 1907.

Location and description.—The Hatchee River is a small stream rising in northern Mississippi, flowing northwesterly through western Tennessee, and emptying into the Mississippi River about 50 miles north of Memphis, Tenn. Its entire length is estimated to be about 350 miles; the distance from Bolivar, the head of former navigation, to its mouth in the Mississippi being about 240 miles. Its average fall from Bolivar to the Mississippi River, as obtained from the elevations of the railroad bridges as furnished by the railroad companies, is estimated as considerably less than 1 foot per mile, whereas from Rialto to the mouth the slope is less than one-half foot per mile.

The Hatchee is a small, shallow, crooked stream, similar in general character to the other neighboring tributaries of the Mississippi, especially in its lower reaches. Its drainage area is roughly estimated at 2,440 square miles. Its low-water discharge is estimated as about 300 cubic feet per second. Its average low-water width is from 60 to 150 feet, and low-water depth from 1 to 3 feet. The river is blocked in many places by snags and rack-piles of drift, rendering navigation at present hazardous and unprofitable. It is crossed by four railroads between Bolivar and its mouth.

History.—The Hatchee River in early days was very extensively used for navigation. From information believed to be reliable it appears that the navigation of this stream commenced as early as 1827. In 1841–42 the State of Tennessee appropriated $100,000, of which one-third was expended on the Hatchee River. After this it seems that considerable commerce developed, six or seven steamboats having been employed each year during the cotton-moving season. It was stated that at that time there was navigation for light-draft boats the year round. (Annual Report of the Chief of Engineers, 1894, p. 1516.) The legislature of Tennessee, however, in 1866, declared the river unnavigable, and authorized the construction of fixed railway bridges. Navigation was in consequence suspended until 1879, when the act was

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repealed and the railroad companies compelled to change their bridges by inserting draw spans to permit the unobstructed navigation of the river.

From these early days to the present the commerce on this stream has constantly dwindled until in 1892 the use of the river for commercial purposes had practically ceased. Since 1892 there has been no commerce of any extent. The great development of the railways of this region and the natural diversion to them of a large volume of the transportation business has doubtless been the main cause of this loss of traffic, but the purchase by the railroads of the best steamboat landings on the larger rivers and their control of many of the lines of steamers has doubtless hampered the through-freight business on many small rivers, and has probably reduced it here as elsewhere mainly to an unimportant local basis.

Previous examination and work.—This stream was first examined on behalf of the United States in 1879 by Maj. W. H. H. Benyaurd, Corps of Engineers. Major Benyaurd recommended that the river be improved by the removal of all obstructing snags, logs, and leaning trees, the estimated cost of which work was placed at $30,000. It was stated that when these obstructions had been removed the Hatchee would be a navigable stream for light-draft boats throughout practically the entire year. On the basis of this report appropriations were made by Congress between 1880 and 1892 amounting to $35,500 in all. As a result of the expenditure of these funds the river was reported navigable for seven months in 1889, for nine months in 1891, and for eight months in 1893. (Annual Report of Chief of Engineers, 1894, p. 1517.) In spite of this improvement the use of the river dwindled until in 1892, owing to the steady diminution of commerce, Captain Willard, Corps of Engineers, reported as follows:

> The small amount of commerce to be benefited is not at all commensurate to the cost of continuing this improvement or to maintaining what has been done, and for this reason it is not believed that any further amount can be expended profitably unless a greatly increased business should be developed.

As a result of this recommendation no further appropriations have been made by Congress, and the maintenance of the navigability of the river has therefore been abandoned.

Counties affected.—The navigable portion of the Hatchee River flows through Hardeman and Haywood counties and forms the boundary line between Lauderdale and Tipton counties, Tenn. The population of these counties, as given by the census report of 1900, was as follows:

County.	Area.	Population in 1900.	Density of population per square mile.
Hardeman	655	22,976	35
Haywood	520	25,189	48.4
Lauderdale	460	21,971	47.7
Tipton	430	29,273	68

NOTE.—The density of population in New York in 1900 was 152.6; of Pennsylvania, 140.1; and of Tennessee, 48.4.

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The total assessed wealth, including real, personal, and other property, was as follows:

County.	Total assessed wealth (1900).	Wealth per capita.
Hardeman	$3,756,017	$163.38
Haywood	3,296,255	130.86
Lauderdale	3,789,580	172.48
Tipton	3,353,862	114.57

NOTE.—The per capita assessed wealth of the United States in 1900 is given as $443.06.

The main towns along the Hatchee River are Bolivar, population about 2,500; Brownsville, population about 2,500, and Rialto, population about 100.

It is thus seen that the country through which the Hatchee River flows is still sparsely populated, although it is said to be one of the richest agricultural sections of west Tennessee.

Commerce.—Owing to the obstructions existing in this stream there is no navigation at present, except between Rialto and the mouth, about 60 miles, where timber products are occasionally transported in times of high water. The principal products of the Hatchee River valley are cotton, corn, tobacco, and timber. The country adjacent to the river is flat, with low banks, heavily timbered, and fertile. From the best information available, the following is a statement of the total use made of the river during the last calendar year:

	Quantity.	Value.
Logs ..... feet B. M..	3,160,000	$31,600
Railroad ties ..... tons..	5,560	45,000
Total	.....	76,600

Improvements practicable.—Owing to the comparatively slight fall of this river and its low banks, it is not believed that any form of improvement for navigation is practicable at a reasonable cost, beyond the removal of snags, overhanging trees, and piles of drift that now effectually obstruct the river. Improvement of the river by a series of locks and dams having sufficient lifts to be useful would doubtless cause a great overflow of land where drainage is now eagerly sought for. This form of improvement would therefore probably cause much damage. Open-river improvement by regulation would be uncertain and expensive, owing to the soft and easily eroded banks and bottom. Removing snags, drift, and overhanging trees is, in my opinion, the only improvement that is worthy of consideration at the present time. It should, however, be borne in mind, even when considering this method, that the result of previous experience on this river has not been encouraging. After the expenditure of $35,500 and clearing the river from near Bolivar to its mouth of all obstructions, so as to render the river available for use during the greater part of the entire year, the effect upon river commerce instead of increasing it has apparently not been sufficiently favorable to overcome the growing competition of the excellent system of railroads in this region.

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The commerce carried by water steadily decreased in consequence of these new transportation lines until in 1892 it had practically disappeared from the river. Although this river flows through a rich and fertile country, the amount of commerce that would now use the river if it should be adequately improved is wholly indeterminate. But little could be expected for many years except lumber, logs, ties, and forest products. It seems probable, in view of the previous experience and present local conditions, that its volume would be slight. It is believed that the cost of the work involved would be out of all proportion to the benefits that would result. There is apparently no better prospect at the present time of stimulating river traffic by improvement than existed in 1880. The need of increased facilities for water commerce is not at present urgent. It is thought that the main benefit that would be expected from any such improvement would be the better drainage of overflowed private land.

Recommendation.—In view of the foregoing, I give it as my opinion that the Hatchee River is not worthy of improvement by the Federal Government for navigation at the present time.

Very respectfully,

WM. W. HARTS,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

OFFICE DIVISION ENGINEER, GULF DIVISION,
New Orleans, La., December 26, 1907.

Respectfully forwarded to the Chief of Engineers, U. S. Army, concurring in the recommendation of the district officer, as stated within.

E. H. RUFFNER,
Colonel, Corps of Engineers,
Division Engineer.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., January 31, 1908.

Respectfully returned to the Chief of Engineers, U. S. Army.

The Hatchee River rises in the northern part of Mississippi and, flowing northwesterly through a portion of Tennessee, empties into the Mississippi River about 50 miles north of Memphis. It has previously been under improvement by the State of Tennessee and by the United States. Appropriations aggregating $35,500 were made by Congress between 1880 and 1892, and expended in clearing the stream of snags, leaning trees, logs, etc., from Bolivar to the mouth, a distance of 240 miles.

Notwithstanding the improved facilities for navigation thus created, it appears that the commerce of the river steadily diminished, and in accordance with recommendations of the district officer, no further appropriations were made subsequent to 1892.

The act calling for the preliminary examination reported upon within limits the investigation to Hatchee River "to town of Brownsville," which is situated in Haywood County. There is no commerce

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on the river above Rialto, a town having a population of about 100, and the commerce between that point and the mouth, a distance of about 60 miles, is confined to timber products which are occasionally transported at times of high water. It is the opinion of the district officer, for reasons stated, that the removal of snags, drift, and overhanging trees is the only improvement that is worthy of consideration at the present time, but in view of the lack of a commensurate commercial development from work of similar character formerly undertaken by the United States and the present sparsely settled condition of the territory, he believes that the cost of such work is out of all proportion to the benefits that would result.

While the improvement of this stream for light-draft navigation, by the removal of snags and similar obstructions, appears to be practicable, a study of the existing commercial conditions and the limited agricultural and industrial development of the locality indicates that there is little probability of commensurate returns from such work in the near future. Having considered all available information in this case, the Board concurs with the district officer and the division engineer in the opinion that Hatchee River to town of Brownsville is at present not worthy of improvement by the United States.

Although persons interested in the proposed improvement were notified by the district officer that they were at liberty to lay before the Board data and arguments, the only communication received has been a resolution of the citizens of Hardeman County, which is situated above that part of the river to which the examination is limited by the wording of the act ordering it.

For the Board:

H. F. HODGES,
Lieut. Col., Corps of Engineers,
Senior Member Present.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 692.

HOMOCHITTO RIVER, MISSISSIPPI.

LETTER

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF EXAMINATION OF HOMOCHITTO RIVER, MISSISSIPPI, FROM ITS MOUTH TO THE YAZOO AND MISSISSIPPI VALLEY RAILROAD.

FEBRUARY 19, 1908.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, February 18, 1908.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, U. S. Army, dated 17th instant, together with copy of report from Maj. J. F. McIndoe, Corps of Engineers, dated January 17, 1908, of a preliminary examination of Homochitto River, Mississippi, from its mouth to the Yazoo and Mississippi Valley Railroad, made by him in compliance with the provisions of the river and harbor act of March 2, 1907.

Very respectfully,

ROBERT SHAW OLIVER,
Acting Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, February 17, 1908.

SIR: I have the honor to submit herewith, for transmission to Congress, report of January 17, 1908, by Maj. J. F. McIndoe, Corps of Engineers, on preliminary examination authorized by the river and harbor act approved March 2, 1907, of Homochitto River, Mississippi, from its mouth to the Yazoo and Mississippi Valley Railroad.

A project adopted by the river and harbor act approved March 3, 1899, is still in force for the improvement of this section of the Homochitto River by the removal of channel obstructions.

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From the facts and for the reasons given in the accompanying report I concur in the opinion of the district officer, the division engineer, and the Board of Engineers for Rivers and Harbors, that, considering only channel improvement in the interest of navigation, this locality is not worthy of further improvement by the United States at the present time.

Very respectfully,

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF HOMOCHITTO RIVER, MISSISSIPPI, FROM ITS MOUTH TO THE YAZOO AND MISSISSIPPI VALLEY RAILROAD.

WAR DEPARTMENT,
UNITED STATES ENGINEER OFFICE,
New Orleans, La., January 17, 1908.

GENERAL: In compliance with Department letter of March 14, 1907, I have the honor to submit the following report upon a preliminary examination of Homochitto River, Mississippi, from its mouth to the Yazoo and Mississippi Valley Railroad, made in accordance with river and harbor act of March 2, 1907.

The examination of the river from the railroad bridge to Jensens Ferry, a distance of about 55 miles, was made in a skiff by Mr. E. B. Geddes, assistant engineer. From Jensens Ferry to the mouth of the river, a distance of about 20 miles, I personally examined the river in a skiff.

The following is quoted from Mr. Geddes's report:

The Homochitto River takes its source near Brookhaven, in southwestern Mississippi, and flows in a westerly direction, and the main channel empties into the Mississippi River, through Old River, about 8 or 10 miles above Fort Adams. From the Yazoo and Mississippi Valley Railroad to the mouth the distance by the river is estimated, from the most reliable data at hand, at 75 miles. For 15 miles below the railroad crossing the river has an average width at low water of about 75 feet, and varies in depth from 2 to 10 feet. There are some shoal places where the depth is not over 1 foot. The river is obstructed by snags, sunken logs, and overhanging trees, but there are no large drifts along this part. For the next 15 miles below, to the mouth of Big Sandy Creek, the channel is wider and deeper than above. It has along this part a minimum width of 100 feet and a maximum of 200 feet and generally a depth of from 5 to 20 feet. There are 4 large drifts in the 15 miles, which almost completely close the channel—the longest being about 2,500 feet.

From the mouth of Big Sandy Creek, for about 20 miles to Coulsons Bayou, the river is very shallow and full of obstructions. For at least half of this distance, the depth is not more than 1 or 2 feet at low water, with a width of from 50 to 100 feet. There are 6 large drifts, 100 to 300 feet long, and the channel is full of trees and logs. For many miles along this stretch there is hardly sufficient water to float a skiff drawing 8 inches. Above Jensens Ferry the river enters the Mississippi bottoms and at high stages divides into several channels and spreads out over a large territory. The main channel at present is through Coulsons Bayou. This bayou has a width of 40 to 50 feet and generally a depth of 6 or 8 feet, but is full of obstructions, such as snags, sunken logs, and trees. Its length is about 5 miles.

The valley of the Homochitto, from the Yazoo and Mississippi Valley Railroad to Jensens Ferry, about 55 miles, has an average width of about 2 miles. The banks are generally low and the bottoms flat and subject to overflows, which occur at all seasons of the year, but usually in the spring and early summer. For this reason there is very little of the bottom land in cultivation.

The hills rise abruptly on each side to a height of 150 feet or more and are mostly covered with forests of pine, ash, oak, and other valuable timber.

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All the land bordering on the river is subject to inundation from the Mississippi as well as the Homochitto and can be reclaimed only by leveeing both streams.

Unless the numerous high-water outlets at and near Jensens Ferry are closed and the flow into Gaillards Lake cut off by a levee, there is probability that the river will forsake its present channel and make a new one direct to the Mississippi River below Palmetto Landing. The distance from the mouth of Coulsons Bayou to the Mississippi in a direct line is about 6 miles, and from a survey made by C. W. Babbit in 1901 there is a fall of 42 feet from the mouth of Coulsons Bayou to water in the Mississippi River when the gauge at Natchez reads zero.

The river above Jensens Ferry is for a great part of the distance very crooked, narrow, and shallow, and filled with obstructions, such as drifts, snags, and overhanging trees. It is likely that if these obstructions were removed the flood line would be lowered so that the high parts of the river bottom could be cultivated; but as the banks are only from 4 to 10 feet above low water, the greater part of the low lands would still be worthless for cultivation. The land is very fertile, and if the estimated 75,000 acres of bottom land between the Yazoo and Mississippi Valley Railroad and Jensens Ferry could be reclaimed and put in cultivation, would produce large crops of cotton, corn, and other products.

There are two bridges over the Homochitto River below the Yazoo and Mississippi Valley Railroad. The first is an iron bridge near Kingston, 30 miles below the railroad, and the other a wooden bridge over Coulsons Bayou. There is also a bridge being constructed near Jensens Ferry.

The people living in Adams County, Miss., and owning lands along the Homochitto River have organized a swamp land district, which includes 28,000 acres, or all the land subject to overflow in the county from the Homochitto above Jensens Ferry.

A fund of $13,500 has been accumulated by taxing the overflowed land for improving the drainage. The commissioners of the swamp land district and most of the people living along the river desire to make a cut-off from near the mouth of Coulsons Bayou to a point on the Mississippi River a few miles below Palmetto Landing. It is thought that the fall of 7 feet to the mile, at low water in the Mississippi, will soon cut out a channel deep enough to relieve the low lands along the lower river below the Yazoo and Mississippi Valley Railroad from disastrous overflows. As a drainage proposition this appears the most promising of any to secure relief, but the new channel would not be navigable except at high stages of the Mississippi, when boats could ascend as far as Jensens Ferry

The main channel of the river turns south at Jensens Ferry and flows near the hills for a distance of about 8 miles, its width being from 40 to 150 feet and depth about 5 feet. In this distance several channels lead off from the right bank into shallow lakes or marshes, which comprise a large part of the bottom lands lying between the hills and the Mississippi River. For the next 7 miles the main channel is very tortuous, very narrow, and winds in and out among large cypress trees; in many places its clear width is not more than 20 feet. The banks are low and several channels lead off into lakes and also into the Buffalo River, a stream which follows closely the bluffs and empties into the Mississippi River near Fort Adams, about 8 miles below the mouth of the Homochitto.

About 5 miles above Old River Lake, the north fork of the Homochitto unites with the main channel, and for this distance the channel is well defined, with banks subject to overflow only during high stages of the Mississippi River. Cotton plantations line both sides. Very few obstructions are found in this stretch except during extreme low water. The channel is about 150 feet wide and the least depth is reported to be about 5 feet.

It is about 8 miles from where the Homochitto enters Old River Lake to its connection with the Mississippi River. At the lower end of the lake there is a bar with a least depth of about 2½ feet at low water. Between Old River Lake and the Mississippi River, a distance of about 2 miles, the river is known as "The Narrows." It is separated from the Mississippi by a narrow strip of land which is gradually caving into the river, the connection with the Mississippi

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now being about 5 miles farther upstream than it was in 1882. Reference is invited to a map of the Homochitto River, plate 4, opposite page 3758, Annual Report of the Chief of Engineers for 1896.

Reports on previous preliminary examinations of the Homochitto River will be found in the Annual Reports of the Chief of Engineers for 1885, page 1429; 1892, page 1839; and 1897, page 1777.

The river and harbor act of 1899 adopted a project for improving this river and appropriated $16,000. The channel was improved for a distance of about 18 miles. By act of June 13, 1902, $2,000 was appropriated for the maintenance of the improvement, with which sum the improved channel was again cleared of obstructions from Old River Lake to the north fork, a distance of about 5 miles. No work has been done since January, 1903.

By the acts of 1905 and 1907, $6,000 additional was appropriated for the maintenance of the improvement.

During the high water of 1906, the Homochitto cut a new outlet through Gaillards Lake into the Mississippi in Deadmans Bend, about 15 miles farther upstream than its present outlet, and there is a probability that the river may eventually follow this route. Moreover, a drainage district has been organized, and it appears to be the desire of the people to assist the river in making this new outlet.

Persons interested in the improvement of the river have been consulted and given opportunity to express their views. As to the commerce on the stream the following is quoted from Mr. Geddes's report:

> There is practically no commerce carried on the Homochitto River at present. At high or moderate stages of the Mississippi boats sometimes enter Old River and go up the river as far as Woodlawn Plantation, some 5 or 6 miles from Old River. The amount of traffic is inconsiderable, as the high water in the Mississippi occurs generally too late in the season to carry off the cotton crop, the principal product raised for market.
>
> I have not been able to gather any reliable data regarding the commerce that would be affected by the improvement of the river. The trade would be only that secured from the adjacent territory. Previous estimates of the probable commerce based on a strip of country 5 miles on each side are probably far from correct. A large part of this territory would not, in my opinion, be tributary to the Homochitto under any circumstances; but some land not included might be, however.
>
> For the first 30 miles below the Yazoo and Mississippi Valley Railroad the trade would probably all go to the railroad points, the distance by land not being over 8 or 10 miles at any place. The distance to any available landing would be nearly as great. The territory in the hills west of Kingston and north of the Homochitto is naturally tributary to Natchez, and the bulk of it would continue to go there. A considerable strip of territory in the hills south of the Homochitto would likely go to the river if improved, and all or nearly all the products raised in the valley would be shipped by boat.
>
> The following is given as an approximate estimate of the trade which would be tributary to the river if improved:

20,000 bales of cotton, at $50	$1,000,000
5,000 tons of cotton seed, at $10	50,000
Other products	100,000
Estimated value of supplies	850,000
Total business	2,000,000

> If the fertile lands of the valley were protected and improved the commerce would be more than doubled.

To make the Homochitto River navigable at low water for the 55 miles above Jensens Ferry would require the removal of drifts, snags, and overhanging trees for almost the entire distance, the widening or straightening of parts of the channel, and dredging for perhaps half

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the distance. The cost of this would be very great and in my opinion the prospective commerce would not justify the expenditure. The 20 miles of river below Jensens Ferry is without commercial importance, either present or prospective. On account of the many channels and changing conditions, it is my opinion that the river is unworthy of improvement by the General Government.

Very respectfully,

J. F. McINDOE,
Major, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

OFFICE DIVISION ENGINEER, GULF DIVISION,
New Orleans, La., January 18, 1908.

Respectfully forwarded to the Chief of Engineers, U. S. Army, concurring in the recommendation of the district officer, as stated within.

E. H. RUFFNER,
Colonel, Corps of Engineers,
Division Engineer.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., February 10, 1908.

Respectfully returned to the Chief of Engineers, U. S. Army.

This stream has been improved by the United States under a project adopted in 1899, when $16,000 was appropriated for the removal of obstructions between the mouth of the river and the Yazoo and Mississippi Valley Railroad bridge, a distance of about 75 miles. Operations under this project resulted in opening a channel 60 to 200 feet in width for a distance of about 18 miles. Several appropriations have since been made for maintenance, including one of $4,000 provided by the act of March 2, 1907.

The preliminary examination reported upon within covers the river from its mouth to the Yazoo and Mississippi Valley Railroad, which is the stretch specified for improvement under the project of 1899. When that project was recommended, it was expected that improved facilities for navigation would stimulate commercial growth in the tributary country, and by providing a freight route for a fertile area having no suitable transportation facilities, the improvement would afford commensurate returns from the expenditures required. This expectation has not been realized. There is practically no commerce on the river at present, and the district officer states that the lower stretch of 20 miles, where operations were concentrated under past appropriations, is without commercial importance, either present or prospective. To improve the upper 55 miles of the portion of river under consideration would require the removal of drifts, snags, and overhanging trees for almost the entire distance, dredging for perhaps one-half this distance, and the widening and straightening of parts of the channel.

From a study of available information bearing upon the commerce of the locality, it is clear to the Board that the purely prospective benefits possibly derivable from this work are not of sufficient importance to justify the relatively large expenditure required to improve the stream for general navigation. In view of this fact, it is the

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opinion of the Board that the Homochitto River, between the points named in the act, is not worthy of further improvement by the United States at the present time.

No communications have been received from local interests who were invited to submit statements and arguments to the Board in behalf of the improvement.

For the Board.

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

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